THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

[REGISTERED AS A NEWSPAPER.]

VOL. XXIII. No. 573.] LONDON, MAY 5, 1874. [26TH YEAR.] Price 6d.

RAMSAY'S NEWCASTLE CANNEL
COAL. Analysis—10,000 cubic feet of gas per ton of coal; 26-candle gas; 13¼ cwt. coke per ton of coal.
The London Exhibition in 1851 was lighted with gas made from Ramsay's Cannel.
RAMSAY'S PATENT CONDENSED COKE.
DO. GARESFIELD COKE.

RAMSAY'S FIRE-CLAY ARTICLES.
GAS-RETORTS, introduced 1838. FIRE-BRICK WORKS, established 1804. FIRE-CLAY SANITARY PIPES, CHIMNEY-TOPS, and all Goods made of Fire-Clay. The Fire-Clay is worked from Blaydon Main Colliery, is of excellent quality, and no expense spared in perfecting every article. The FIRE-BRICKS (marked "RAMSAY") are to be seen in all parts of the world, and the Works are the most extensive in the Kingdom.
Manufactories—Derwenthaugh, Swalwell, and Hebburn Quay, near Newcastle-on-Tyne; and London Wharves—Falcon Wharf, No. 80, Bankside; and Honduras Wharf, Cubitt Town. Large stocks kept.
Address G. H. RAMSAY, NEWCASTLE-ON-TYNE.

GENUINE TORBAY PAINT
AND
ANTI-GALVANIC PAINT.
FOUR PRIZE MEDALS.
WORKS: BRIXHAM, TORBAY.
These Paints are now used in 100 Country Gas-Works, and by all (but one) of the London Gas Companies, on Gasholders, Scrubbers, Purifiers, &c. They will cover tar effectually. Also used by the Admiralty, War Office, Railway Companies, Founders, &c.
They prevent and arrest rust, and protect iron from the action of water, sulphurous and gaseous exhalations.
The covering powers are considerably greater than those of any other Paint.—*See "Engineer," Nov.* 2, 1866.
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PATENTEE & CONTRACTING GAS ENGINEER
FOR
SETTING RETORTS,
ERECTING AND REMODELLING
GAS-WORKS OF ANY EXTENT,
AT HOME OR ABROAD.
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COWEN'S PATENT FIRE-CLAY RETORTS.
JOSEPH COWEN and CO.,
BLAYDON BURN, BLAYDON-ON-TYNE,
Were the only parties to whom a PRIZE MEDAL was awarded at the GREAT EXHIBITION of 1851, for "GAS-RETORTS and other OBJECTS in FIRE-CLAY," and they were also awarded at the INTERNATIONAL EXHIBITION of 1862, the PRIZE MEDAL for "GAS-RETORTS, FIRE-BRICKS, &c., for EXCELLENCE of QUALITY."
J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts and Fire-Bricks in the Kingdom. Orders for Fire-Clay Retorts of all shapes and dimensions, and to fit any shaped Mouthpiece, Fire-Bricks, and every other article in Fire-Clay, are promptly executed at their Works as above.
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Coal Office,
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JOHN RUSSELL AND CO.,
THE OLD TUBE-WORKS, WEDNESBURY
AND
THE ALMA WORKS, WALSALL.
Established at the commencement of Gas Lighting.
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35, 36, 37, & 39, GRANBY ROW, MANCHESTER.
J. R. and Co. are the original manufacturers of Wrought-Iron Gas Tubes and Fittings, and Inventors of the LAP-WELDED TUBES for Locomotive and Marine Boilers.
J. R. and Co. make all kinds of Tubes and Fittings for Gas, Steam, and Water; Gun-Metal Cocks, Stocks, and Dies; Galvanized Tubes and High-Pressure Tubes, &c.
Lists may be obtained on application to
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BELL BARN ROAD, BIRMINGHAM,
MANUFACTURERS OF
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FIRST-CLASS MATERIALS & WORKMANSHIP;
Also, STATION-METERS, PRESSURE-GAUGES, STREET-LAMPS, REGULATORS, &c.
ESTABLISHED 1830.

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MANUFACTURERS OF
TELESCOPIC & SINGLE GASHOLDERS,
CAST & WROUGHT IRON TANKS FOR DITTO,
And Gas Apparatus of every Description.
Marine, Tubular, Cornish, Plain, Furnace, Saddle, and Range Boilers.
SUGAR, SALTPETRE, AND ALL KINDS OF PANS.
Roofs, Girders, and Bridges, and General Smith's Work.
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J. & W. ROMANS, Consulting Gas Engineers and Coal Factors, of Edinburgh and London, CONTRACT for supplying any quantity of COAL and CANNEL.
They are also Contractors for leasing Gas-Works, for supplying, erecting, or repairing gas apparatus and fire-clay goods.
Messrs. ROMANS, being lessees of several Gas-Works, have their Cannels tested in the ordinary working process, thus securing for their customers a guarantee beyond mere laboratory experiments.
Analysis, prices, and other information will be forwarded on application to their Offices, 8, Forth Street, EDINBURGH; 1, Walbrook, Mansion House, LONDON, or to the "Crown Wharf," Thomas Street, Limehouse, LONDON, where stocks of house, steam, and gas coal are always on hand.
Coal, machinery, fire goods, &c., shipped to all parts of the world.

THE
DUKE OF HAMILTON'S
LESMAHAGOW
CANNEL COAL.
AGENT:
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GEORGE GLOVER & CO.,
PATENTEES OF THE
NATIONAL STANDARD GASOMETERS
For the English Government, and for the Government of the Netherlands;
MAKERS OF THE DUPLICATE COPY
Presented by Her Majesty's Government to the French Government;
AND MANUFACTURERS OF
IMPROVED
DRY GAS-METERS,
Warranted to Measure correctly, and not to vary.
RANELAGH WORKS, RANELAGH ROAD, PIMLICO, LONDON, S.W.;
236, GEORGE STREET, GLASGOW; AND 15, MARKET STREET, MANCHESTER.

G. G. and Co. have just received the only Medal awarded for Gas-Meters at the Vienna International Exhibition.

SILVER MEDAL, PARIS EXHIBITION, 1867.

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ALBION TUBE-WORKS, BIRMINGHAM,

MANUFACTURERS OF

WROUGHT-IRON TUBES AND FITTINGS

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LAP-WELDED IRON AND HOMOGENEOUS METAL BOILER TUBES.

Boiler-Tube Ferrules, Gun-Metal Gland Cocks, Water-Gauges, Whistles, &c.; Stocks, Taps, and Dies for Screwing, and Gas-Fitters Tools.

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MANUFACTURERS of FIRE-BRICKS, LUMPS, & TILES,

AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.

N.B.—A Stock of 15 and 16 in. CIRCULAR RETORTS always on hand. Other kinds made to order on short Notice.

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MANUFACTURERS OF EVERY DESCRIPTION OF

Corporate Mark
SOHO
Granted 1763.

STEEL TOOLS FOR GAS & WATER WORKS.

All-Steel Charging and Stoking Shovels, Coke Screens and Forks, Steel Scoops, Picks, Mattocks, Axes, Trowels, &c.

WELDING STEEL RAKE AND SPUD HEADS.

SUPERIOR CAST-STEEL FILES and SAWS; Solid Cast-Steel Hand and Sledge Hammers.
BEST CAST STEEL for making Chisels, Turning Tools, Taps and Dies, Drills, Snaps, &c.
SINGLE AND DOUBLE SHEAR, Spring, Sheet, and Blister Steel.
SILVER STEEL for Rod-Chisels and Diamond-Points for Cutting Cast-Iron Pipes, and for other work requiring a Special Quality and Temper, and every other description of Steel and Tools as supplied to the largest London Gas Companies, Contractors, and Engineers.

SOHO STEEL-WORKS, SHEFFIELD, & 2, GRESHAM BUILDINGS, BASINGHALL ST., LONDON, E.C.

GAS PURIFICATION & CHEMICAL Co., LIMITED,

(Successors to JOHN WILLIAM O'NEILL & CO.,)

Offices—PALMERSTON BUILDINGS, OLD BROAD STREET, LONDON, E.C.,

CONTRACTORS FOR GAS PURIFICATION BY OXIDE OF IRON.

The superiority of the material supplied by this Company is generally recognized, and it is now in use in nearly all the London and most of the large Provincial Gas-Works.

JOHN WILLIAM O'NEILL, SAMUEL H. JOHNSON, } Joint Managing Directors.

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THE MEDAL FOR 1862.

The only Prize Medal awarded for TUBES & FITTINGS.

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WAREHOUSE: SOUTHWARK STREET, LONDON.

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ONLY MAKERS OF HOMOGENEOUS METAL TUBES.

MANUFACTURERS OF

TUBES and FITTINGS for GAS, STEAM, and WATER;

LAP-WELDED, LOCOMOTIVE, MARINE, and other BOILER TUBES;

HYDRAULIC TUBES, BEDSTEAD TUBES, WELL TUBES, TELEGRAPH POSTS, COILS, &c.;

GAS-FITTERS TOOLS, VALVES, COCKS, &c.

THOMAS PIGGOTT & CO.,

(Established 1822,)

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MANUFACTURERS OF

TELESCOPIC & SINGLE GASHOLDERS,

CAST & WROUGHT IRON TANKS FOR DITTO;

PURIFIERS, CONDENSERS, SCRUBBERS, RETORTS, VALVES;

IMPROVED WROUGHT-IRON RETORT-LIDS, CROSS-BARS, & SCREWS;

AND GAS APPARATUS OF EVERY DESCRIPTION.

SOLE MANUFACTURERS OF LIVESEY'S PATENT GASHOLDER MAN-LID,

By use of which Man-lid, inlet and outlet pipes can be examined and cleansed without loss of gas in crown of holder, or ingress of atmospheric air.

ROOFS, GIRDERS, BRIDGES, AND BOILERS OF ALL KINDS.

Drawings, Specifications, and Estimates supplied on application.

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COOMBS WOOD PATENT TUBE-WORKS.

OLD HILL, near DUDLEY,

MANUFACTURERS OF

HOWARD'S PATENT IMPROVED WROUGHT-IRON TUBES,

FOR GAS, STEAM, AND WATER;

Also ORDINARY WELDED WROUGHT-IRON TUBES and FITTINGS,

FOR GAS, STEAM, & WATER, EITHER BLACK, GALVANIZED, OR ENAMELLED.

CORE BARS FOR IRONFOUNDERS, STOCKS, TAPS, AND DIES, IRON COCKS, &c.

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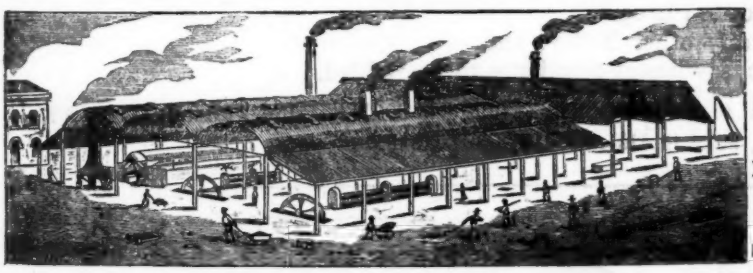


Iron Roofs, Iron Buildings, &c.

ISAAC DIXON,

HATTON GARDEN LIVERPOOL,

MANUFACTURER OF

GALVANIZED CORRUGATED CURVED IRON ROOFING, WROUGHT-IRON FRAMED ROOFING, IRON BUILDINGS

OF EVERY KIND.

WROUGHT-IRON TANKS, WROUGHT-IRON PIPES & TROUGHS, & GENERAL WROUGHT-IRON WORK.

I. D.'s CORRUGATED CURVED SELF-SUPPORTING IRON ROOFS are specially suitable for Forges, Rolling-Mills, Iron-Works, Shipbuilding Yards Mines, Collieries, Gas and Water Works, and for general purposes.

For Roofs with Timber Framing, I. D.'S GALVANIZED OR PAINTED CORRUGATED SLATES OR SHEETS form a durable and cheap covering, costing only about the same, when fixed complete, as felt and boards.

DRAWINGS AND ESTIMATES ON APPLICATION.

VICKARYS AND ROBERTSON,

Late JOHN VICKARY,

ESTABLISHED 1840.

GAS ENGINEERS, CONTRACTORS, IRON AND BRASS FOUNDERS,

WEST OF ENGLAND ENGINEERING WORKS, EXETER.

GASHOLDERS AND TANKS,

Retorts, Retort-Fittings, Condensers, Scrubbers, Purifiers, Station-Meters, Governors, Rack and Screw Valves. Gas and Water Mains always in Stock.

STEAM-ENGINES, EXHAUSTERS, SHAFTING AND GEARING, &c.

GAS-FITTINGS,

Including Chandeliers, Pendants, Hall Lamps, Brackets, Star and Sun Lights of all designs.

WET & DRY GAS-METERS,

Combining most recent improvements in principle and manufacture; upwards of 200,000 already in work, giving highest satisfaction. (A guarantee of five years given with every Meter.)

PLUMBERS WORK, including Lift and Force Pumps; Cocks for Gas and Water and Steam; Brass Fittings.

HYDRAULIC AND GENERAL ENGINEERING

LONDON OFFICE: 8, JOHN STREET, ADELPHI, W.C.

THE IMPERIAL METER COMPANY, LIMITED,

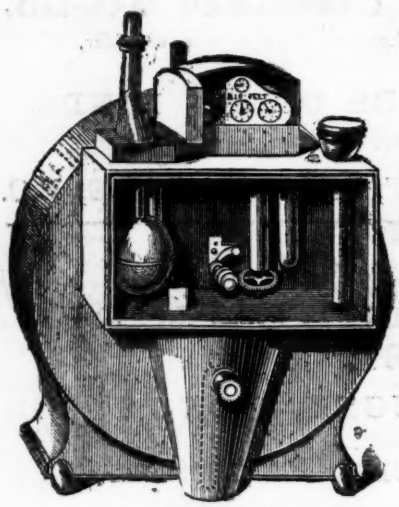
MANUFACTURERS OF

WET AND DRY GAS-METERS,

PRESSURE-GAUGES AND GOVERNORS, AND STREET-LAMP REGULATORS.

FACTORIES:

KING'S ROAD, LONDON, N.W., and GRAY'S INN ROAD, LONDON, W.C.



Front View.

THE

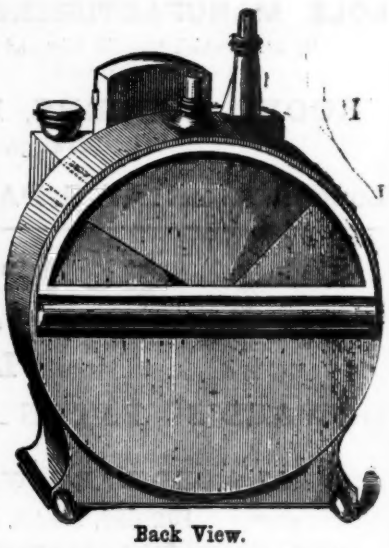
IMPERIAL

COMPENSATING

WET GAS-METER.

DE CASTRO & BURTON'S

PATENT.



Back View.

I. This Meter is more simple in construction than the common non-compensating Meter.
II. An unvarying water-line is maintained.
III. No amount or kind of pressure will cause it to "flood."
IV. It is practically unaffected by "tilting."
V. The friction is less than in any other Meter; and
VI. It will last for twelve months without requiring to be refilled.

THE IMPERIAL METER COMPANY, LIMITED, ALSO MANUFACTURE COMMON NON-COMPENSATING WET GAS-METERS OF ALL SIZES, BOTH IN TIN AND CAST-IRON CASES.

SPECIAL ATTENTION

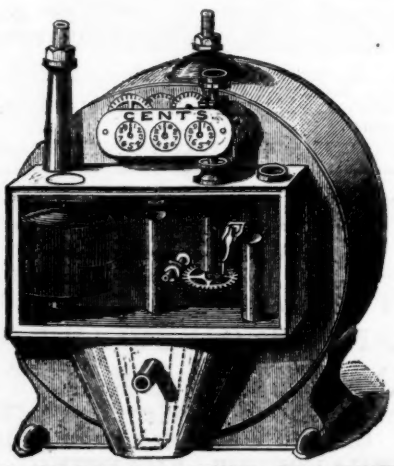
IS PAID TO THE

MANUFACTURE OF

STREET-LAMPS

AND

REGULATORS.



THE IMPERIAL WET GAS-METER.
Non-Compensator.

STATION-METERS

WITH PLANED JOINTS,

AND

GOVERNORS,

MADE TO ORDER.

Mr. GEORGE MACKANESS will represent this Company in the Provinces.

OFFICES: 41, FLEET STREET, LONDON, E.C.

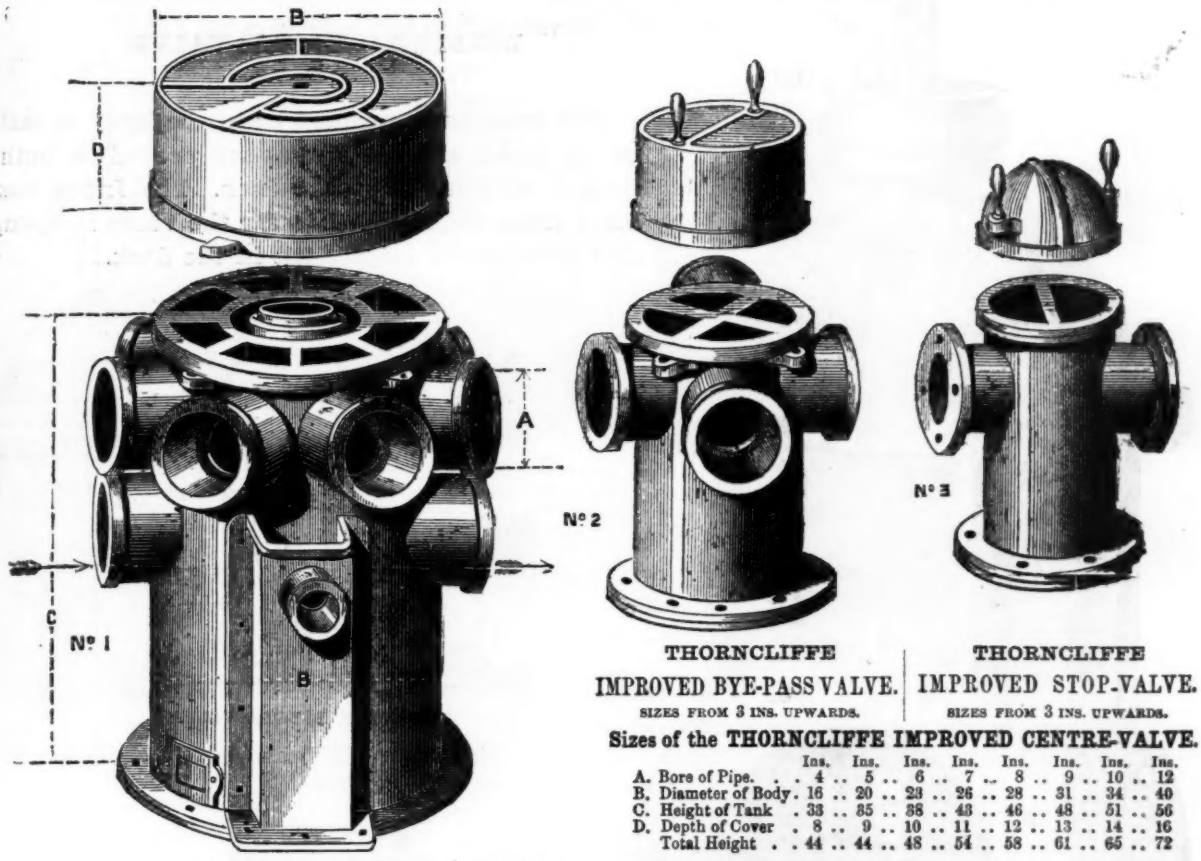
W. MOORE, Secretary.

☞ *All Communications to be addressed to the Secretary.*

MESSRS. NEWTON, CHAMBERS, & CO.,

THORNCLIFFE IRON-WORKS, NEAR SHEFFIELD.

IMPROVED CENTRE-VALVES.



THORNCLIFFE IMPROVED BYE-PASS VALVE. SIZES FROM 3 INS. UPWARDS.

THORNCLIFFE IMPROVED STOP-VALVE. SIZES FROM 3 INS. UPWARDS.

Sizes of the THORNCLIFFE IMPROVED CENTRE-VALVE.

	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
A. Bore of Pipe. . .	4 ..	5 ..	6 ..	7 ..	8 ..	9 ..	10 ..	12
B. Diameter of Body.	16 ..	20 ..	23 ..	26 ..	28 ..	31 ..	34 ..	40
C. Height of Tank .	33 ..	35 ..	38 ..	43 ..	46 ..	48 ..	51 ..	56
D. Depth of Cover .	8 ..	9 ..	10 ..	11 ..	12 ..	13 ..	14 ..	16
Total Height . .	44 ..	44 ..	48 ..	54 ..	58 ..	61 ..	65 ..	72

In all cases the Covers are cast heavy enough to resist any required pressure.

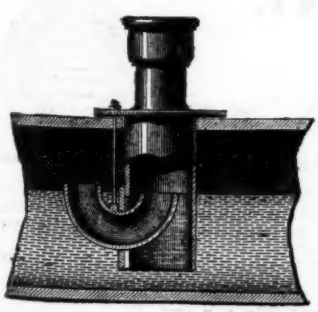
The advantages derived from the adoption of these Valves are so manifest and cardinal that in the immediate character of the change—the simplicity of the machine—the facility affording for cleaning out connexions between Valve and Purifier—the perfect collection and delivery by suitable overflow of the ammonia, at a greatly diminished depth from ground-line over the old form of Valve—the advantage of connecting on the same level, and at any angle, or opposite to each other, the inlet and outlet pipes without dip or rise—the clear acquisition of space in the purifying-house, by being able to place the boxes nearer together, the new Valve being entirely under the floor—and lastly, though of the greatest importance, the passage of crude and unpurified gas during the change is minimized to the merest fraction, thus preventing the fouling by impure gas the delicate machinery and easily affected exposed movements of the station-meter, thereby preventing the introduction of the enemy (unpurified gas) into the gasholder. Also a dead abutment is offered to all back pressure, imparting thereby to the gauges, governors, and hydraulic seals, a steadiness of action never realized with the once famous, but now fast becoming obsolete, Hydraulic Centre-Valve.

N., C., and Co. also Manufacture and Erect

PURIFIERS, CONDENSERS, SCRUBBERS, GASHOLDERS, ROOFS,

And every description of Gas Machinery.

TENDERS GIVEN FOR WORK FIXED COMPLETE IN ANY PART OF THE KINGDOM.



Messrs. N. C. & Co. are also the Sole Agents for

HAWKINS' PATENT SELF-ACTING DIP-PIPES.

These Patent Self-Acting Dip-Pipes are rapidly coming into general use by gas companies. By their use the whole of the pressure caused by the old kind of Dip-Pipes is entirely removed, therefore the yield of gas per ton of coal is considerably increased. They also act as a perfect safeguard against the deposit of carbon (or scurf) inside the retorts.

A saving of fuel is effected, and the wear and tear to the retorts greatly diminished.

They are also perfectly Self-Acting, they being regulated solely by the gas. They cannot get out of repair, and when once fixed, will last as long as the old kind, and can be easily adjusted should the hydraulic main sink; they can also be worked with advantage where there is no exhauster.

Testimonials can be had from Herbert Unwin, Esq., engineer of the Sheffield United Gaslight Company and the Penistone Gas Company. At both these companies works they have been in constant operation for several months. Further testimonials can be had on application to the Patentee, J. G. Hawkins, Effingham Street Gas-Works, Sheffield.

For Prices, &c., apply to

Messrs. NEWTON, CHAMBERS, & CO.,

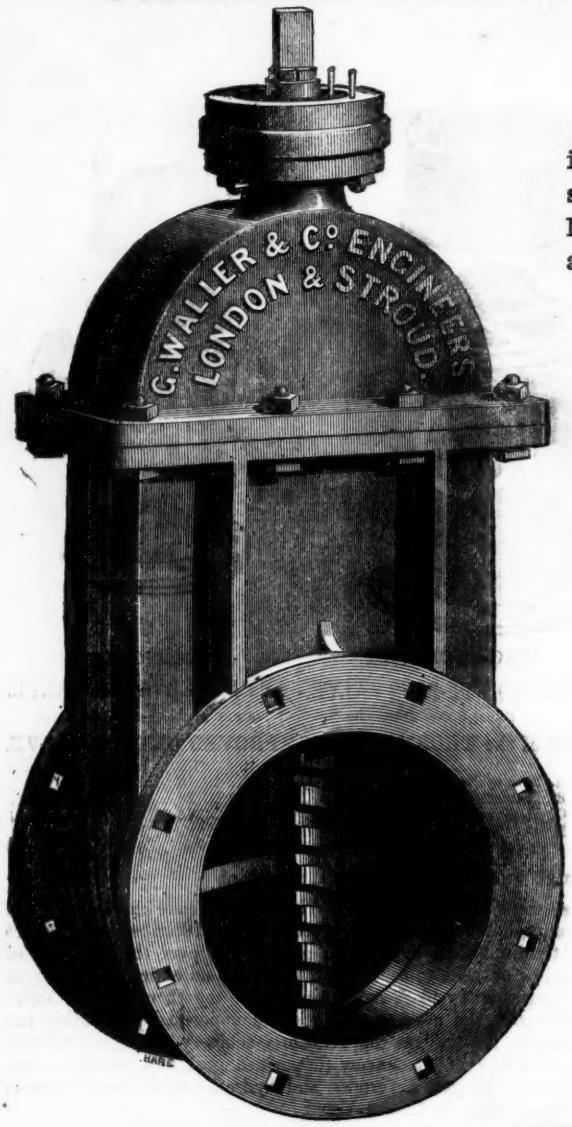
THORNCLIFFE IRON-WORKS, near SHEFFIELD.

GEORGE WALLER & CO.,

GAS ENGINEERS AND CONTRACTORS,

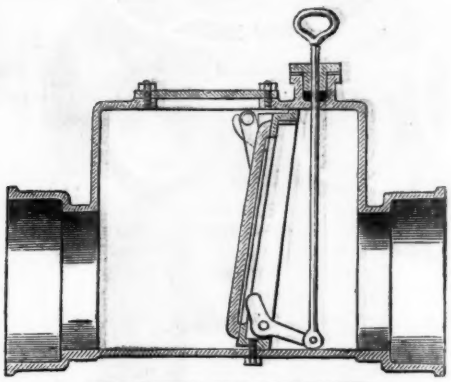
MANUFACTURERS OF

BEALE'S IMPROVED PATENT GAS-EXHAUSTERS, COMBINED ENGINES AND EXHAUSTERS.

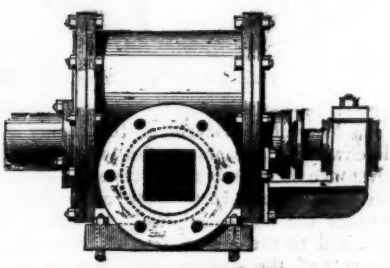


DOUBLE-FACED GAS-VALVE.

The Door has a wedged back, the Body is cast in one piece, and the Valves are proved on both sides to 30 lbs. per square inch. The Index has large studs to indicate how far the Valve is open, and they can be readily felt in the dark.



SELF-ACTING BYE-PASS VALVE.



BEALE'S EXHAUSTER.

PUMPS, VALVES (2 in. to 30 in.), HYDRAULIC REGULATORS, ENGINES, &c., in STOCK.

PHŒNIX ENGINEERING WORKS, HOLLAND STREET, SOUTHWARK, S.E.,

AND AT

STROUD, GLOUCESTERSHIRE.

1862.

PATENT ANTIMONY PAINT.

CLASS II.

MADE ONLY BY

GEORGE HALLETT & CO.,

296, ROTHERHITHE, LONDON, S.E.

This Paint having been in general use over twelve years (especially in some of the principal Gas-Works), and proved itself the best light-coloured Paint produced for resisting the influence of vitiated atmospheres, it is important that its qualities should be more widely known.

It is not discoloured like white lead in a sulphuretted atmosphere, nor washed off like white zinc; and its light colour reflecting heat, produces much less expansion of gas in holders painted with it than with dark colours, besides rendering them much more sightly. Its specific gravity is so much below white lead that the same weight will cover one-third more surface, while it is equal in body; and its price being about the same (30s. per cwt.), it is actually one-third cheaper. From experience, its manufacture is greatly improved, and it is quite suitable for all purposes in which white lead is employed.

Reference is kindly permitted by the Engineers of the City of London, Commercial, London, and Surrey Consumers Gas Companies, who pronounce it the best Paint known for their purposes.

N.B.—Antimony Paint, COVERING SO MUCH MORE WORK, costs about 20s. per cwt., as compared with White Lead at 30s. per cwt.; a similar economy arises from its use in Steam and Gas Joints, for which purpose it is superior to White Lead.

SPECIAL DRIERS FOR ANTIMONY PAINT SUPPLIED.

TANGYE BROTHERS AND HOLMAN,

LAURENCE POUNTNEY LANE, LONDON, E.C.,

SOLE MAKERS OF

MORTON'S PATENT SELF-SEALING RETORT-LIDS,

WITH

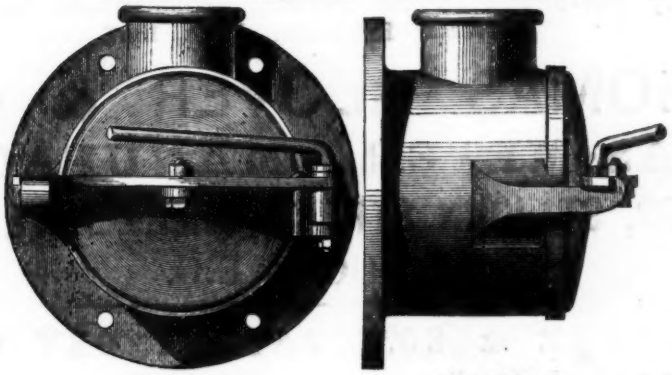
HOLMAN'S PATENT ECCENTRIC FASTENINGS.

OVER 10,000 IN USE.

NO LUTING.

LIDS HINGED TO MOUTHPIECES; NO LIFTING ON OR OFF.

NO SCREWS FOR FASTENING.



FRONT VIEW. SIDE VIEW.

SIMPLE.

ECONOMICAL.

DURABLE.

EFFECTIVE.

NO DUPLICATE LIDS REQUIRED.

These Lids are proved by many eminent Gas Engineers to be the most efficient, saving much time, labour, and expense; are opened and closed as quickly and with as little trouble as an ordinary furnace door, and by their use the Retorts are soundly sealed during the whole period of carbonization.

These Lids are Adopted by the following (among many other) Gas Companies:—

The Gaslight Company, Beckton (where over 2000 are in use).
" Gaslight Company, Bow Common.
" London Gaslight Company.
" Independent Gaslight Company.
" Phœnix Gaslight Company.
" South Metropolitan Gaslight Co.
The West Ham Gas Company.
" Imperial Gaslight Company.
" Gas-Works, Arsenal, Woolwich.
" Commercial Gas Company.
" Alliance and Dublin Gas-Works.
" Edinburgh Gas-Works.
" Manchester Corporatn. Gas-Works.
The Salford Corporation Gas-Works.
" Rochdale Corporation Gas-Works.
" Liverpool United Gas-Works.
" Birkenhead Gas-Works.
" Birmingham Gas-Works.
" Nottingham Gas-Works.
" Newcastle-on-Tyne Gas-Works.
The Carmarthen Gas-Works.
" Merthyr Tydfl. Gas-Works.
" Ystrad Gas-Works.
" St. Alban's Gas-Works.
" Over Darwen Gas-Works.
" Aylesbury Gas-Works.
" Cardiff Gas-Works.

The Morton's Lid is made circular in form, that being the most convenient and suitable shape. It can be used for Retorts of any section, by adapting the Mouthpiece casting from the D, oval, or other shape, at the back, to circular in front.

The following important Testimonial, among others, has been given:—

"*The Gaslight and Coke Company. Engineer's Office, 6, Westminster Chambers, Nov.* 14, 1871.

"Dear Sir,—In reply to your inquiry, I have the pleasure of stating that the whole of the Mouthpieces at Beckton have Morton's Lids attached to them, and they have given us every satisfaction. We have 2160 in use.—I remain, yours truly, (Signed) "F. J. EVANS."

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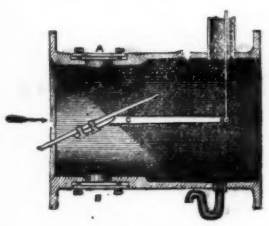
HUNT'S PATENT EQUILIBRIUM GAS GOVERNOR.



In this Governor a Throttle-Valve is substituted for the ordinary suspended Cone, all external communications being avoided by placing the Lever or Radius Arm (shown at C on the drawing) inside the Valve-Chamber upon the Disc. The Disc is carried upon steel centres, upon which it is accurately balanced and turns freely. The friction in working is thereby reduced to a minimum. This Governor is extremely sensitive to alterations of inlet or outlet pressure, and renders a large actuating holder unnecessary.

The principal advantages of this arrangement over the ordinary form of Governor are as follows:—

Its sensitive action prevents oscillation.

It is self-adjusting—*i.e.*, it maintains a steady pressure under variations of inlet pressure or a fluctuating consumption.

The inlet to Gasholder being contracted to the smallest possible dimensions, all danger from leakage through insufficiency of seal, tilting, &c., is entirely avoided.

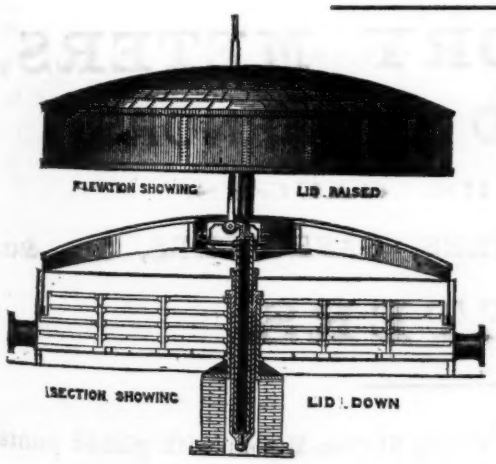
The valve portion being separate from the holder, it can be handled and fixed like an ordinary Slide Valve direct in the main; and the holder can be placed at any convenient distance immediately above it. The cost is thus materially reduced, and the inconvenience of heavy lifts done away with.

There are no working parts likely to get out of order.

These Governors have been adopted by several leading Gas Companies, among whom are the following:—

The Gaslight Company—a 24 in. at Whitechapel District Station.
" " a 36 in. at Goswell Road Station.
" " a 24 in. at " "
" " a 24 in. at the Gas-Works, Beckton.
The Gaslight Company—a 6 in. at the Gas-Works, Beckton.
The London Gas Company—an 18 in. at the Gas-Works, Nine Elms.
" " an 8 in. at " "
" " a 24 in. at " "

Also at the Gas-Works, Rochdale, Monmouth, Devonport, Cannes, and Mentone (France), &c.



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DIRECT HYDRAULIC LIFT

FOR PURIFIER LIDS

REQUIRES NO TRAVELLERS, CRANES, CHAINS, OR OTHER GEAR.

SAFE, SIMPLE, AND DURABLE.

ANY SIZE LID MAY BE RAISED BY ONE MAN.

Eight Hydraulic Lifts have been applied at Beckton Gas-Works to raise the Covers of the large Check Purifiers, which are 40 feet diameter, during the past three years, with perfect success.

London 1851. New York, 1853. Paris, 1855. London, 1862.

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PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.

Paris, 1867.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

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THOMAS GLOVER & CO.'S PATENT DRY GAS-METERS,

1st, Are a remedy for all the defects of Wet Meters;
2nd, Are suitable for all climates, whether hot or cold;
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4th, Cannot become fixed by frost, however severe;
5th, Are the most accurate and unvarying measurers of Gas;
6th, Prevent jumping or unexpected extinction of the Lights;
7th, May be fixed either above or below the level of the Lights;
8th, Cannot be tampered with, without visibly damaging the outer case;
9th, Will last much longer than Wet Meters;
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Are upheld for five years without charge.

WILLIAM PARKINSON & CO.,

(SUCCESSORS TO SAMUEL CROSLEY,)

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STATION-METERS AND GOVERNORS,

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EXPERIMENTAL METERS, PHOTOMETERS, GASHOLDERS, &c., &c.

WATER METERS.

W. P. & Co. beg to state that they are now prepared to supply Station-Meters with planed joints.

CONTENTS.

Circular to Gas Companies:— PAGE
The Tunbridge Wells Gas Company before Committee . . . 613
Withdrawal of the Birmingham Gas Bill . . . 613
Probable Cost of the Purchase of the Metropolitan Gas Companies . . . 613
The Neath Corporation Gas and Water Bill . . . 613
The Report of the Metropolitan Board of Works for 1873 . . . 613
Gas Purification in London . . . 614
Leading Articles:—
Water and Sanitary Notes . . . 614
A Treatise on the Science and Practice of the Manufacture and Distribution of Coal Gas . . . 615
Correspondence:—
Improvement in Street Lanterns . . . 616
Purification of Gas . . . 616
Illuminating Power of Edinburgh Gas . . . 617
The Early History of the Surrey Consumers Gas Company . . . 617
Parliamentary Intelligence:—
Progress of Bills in House of Lords . . . 617
Progress of Bills in House of Commons . . . 617
House of Commons Committee—
Tunbridge Wells Gas Bill . . . 618
Truro Water Bill . . . 624
Legal Intelligence:—
Court of Queen's Bench—Lester *v.* The Corporation of Halifax . . . 624
Miscellaneous News:—
Birmingham Water Supply . . . 617
Securing Water-Pipes against Frost . . . 617
Meeting of the Singapore Gas Company . . . 624
Meeting of the Continental Union Gas Company . . . 625
Meeting of the Collingwood, Fitzroy, and District (Australia) Gas Company . . . 626
Meeting of the Bahia Gas Company . . . 627
Presentation to the Manager of the Lancaster Gas-Works . . . 627
Metropolis Gas Supply . . . 628
Metropolis Water Supply . . . 628
Association of Municipal and Sanitary Engineers and Surveyors . . . 628
The Northern Coal Trade . . . 629
Swansea Gas Company . . . 629
Ammoniacal Gas Refuse as a Remedy for Insects on Trees, &c. . . . 629
Iron and Coal Trades of Sheffield, South Yorkshire, and North Derbyshire . . . 629
Glasgow Water Supply . . . 629
Uckfield Gas Company . . . 629
Appointment of Medical Officer of Health to the City of London . . . 629
Register of New Patents:—
Silber, A. M.—Gas-Burners . . . 630
Nicholson, R.—Charging and Discharging Gas-Retorts . . . 630
St. John, W. H.—Purifying Gas . . . 630
Robey, J.—Treating Sewage, &c. . . . 630
Applications for Letters Patent . . . 630
Grants of Provisional Protection . . . 631
Notices to Proceed . . . 631
Patents which have passed the Great Seal . . . 631

TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

THE JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, MAY 5, 1874.

Circular to Gas Companies.

The Tunbridge Wells Gas Company have, so far, succeeded with their Bill in the House of Commons. Opposition is, however, to be renewed before the committee of the House of Lords, and what the final result may be, it is difficult to foretell. As much use as possible was made, before the Commons committee, of the fact, that the site selected by the company for new works is within a mile and a quarter of the residence of the Marquis of Lorne, and it was strongly suggested that the works must necessarily be a nuisance to that nobleman. The Local Board will, no doubt, force the same fact upon the attention of the Lords committee, and endeavour to excite the sympathy of the peers for one of their order. Since, however, the noble marquis has not petitioned against the Bill, it may be presumed that he has no belief that his comfort will be interfered with by gas-works a mile and a quarter away, and not visible from his mansion. The objections made to the site on other grounds appear to be as trivial. It seems to be about 300 yards from the "High Rocks," a pleasure resort of visitors to Tunbridge Wells; but at this point the greater part of the buildings will be hidden from view, while well-conducted gas-works cannot be productive of nuisance to a locality 300 yards distant. On the other hand, it is proved that the proposed site is particularly well adapted for the purposes of the company, and will, in the end, prove advantageous to the gas consumers. Reverting for a moment to the question of nuisance, we may suggest that the gas company, being as much interested as any one in the prosperity of Tunbridge Wells, it is very unlikely that the directors would do anything calculated to drive visitors away from the place. If such a result should follow these proceedings, the Local Board, who have provoked the hubbub, may be thanked for it.

The Bill of the Birmingham Gas Company has been withdrawn, and gas affairs in that borough will remain in *statu quo* until next year. As we pointed out last week, the interval may be usefully employed by the Corporation of Birmingham in arranging terms with the several local authorities whose districts lie within the gas limits. It can hardly be difficult for the mayor, so apt at negotiation, to arrive at a good understanding with these authorities. If it could be possible for them to purchase the mains within their districts, and be supplied with gas in bulk, their grounds of opposition would be removed. There are, however, great difficulties in the way of the smaller boards coming to an arrangement of this kind—easy enough in the case of the Corporation of Walsall.

Those in Birmingham who have objected to the price agreed upon with the Corporation for the purchase of the undertakings, and those in London who are advocating the purchase of the gas companies by the Metropolitan Board of Works, may have learnt something from a perusal of the recent debate on the suggested purchase of the Irish railways by the State. It is difficult, by the way, to see why the purchase and working of railways should be considered beyond the functions of the State, while the purchase of gas and water undertakings is considered to be a duty on the part of municipalities; but many people see a great difference in the two things, which, to our mind, is not at all apparent. Here, however, we are only concerned with the estimated cost of the transfer, as very ably set forth by Mr. J. Goldsmid. There are, it appears, something like 600 millions invested in railways in the United Kingdom, producing an average dividend of 4½ per cent. To take over these undertakings would necessitate the issue of Consols for 900 millions; or, adding 10 per cent. consideration for the compulsory purchase, 1000 millions, so more than doubling the National Debt in one operation. The purchase of the metropolitan gas companies by the Board of Works on similar terms would involve the issue of "Consolidated stock" to the value of at least 25 millions. The last recommendation we have seen in print is that the Board should take the companies, guaranteeing maximum dividends on share capital, and devoting surplus profits to the redemption of capital. In this way the writer seemed to think that the companies would be got for nothing. The plan, if carried out, we believe, would prove of doubtful value to the gas consumers of the metropolis, who would have to wait indefinitely for a reduction of price.

A contemporary, who has treated the gas question with more intelligence than is generally exhibited when writers in the daily papers discuss the matter, has revived a suggestion made by the delegates of the vestries and district boards in 1859, which was embodied in the Bill brought in by Mr. Ayrton and Sir J. V. Shelley. The suggestion is, that the dividends of a gas company should be adjusted on a sliding scale, so as to make them follow an inverse ratio to the price of gas. More might be said in favour of this idea if the dividend were not limited to 10 per cent. If one company can sell gas at half the price another supplies it for, the one is fairly entitled to a larger dividend, if it can be earned at the lower price. A sliding scale below the maximum dividends now allowed is, however, out of the question.

The Bill promoted by the Corporation of Neath to obtain power to purchase the Neath New Gas and the Neath Water Companies has been reported by the committee of the House of Lords, with amendments. These, we believe, refer almost exclusively to the purchase of the water company, the gas company and the Corporation having arrived at an understanding. The views expressed by the committee, as reported in our last issue, were of an eminently satisfactory character, inasmuch as they showed their lordships to be strongly opposed to anything like confiscation. Their suggestion, also, that the Corporation should not have power to levy a gas-rate where no gas is supplied, is indicative of a practical attention to minute details which is highly praiseworthy.

The report of the Metropolitan Board of Works for 1873 has just been issued, and a short space is, as usual, devoted to an account of the dealings of the Board with the gas supply. Only three companies come under the supervision of the Board, and although the Board naturally wish to see some uniform system of regulation in force with respect to all the companies, they think it useless at present to make any movement in promoting some more general enactment. The proceedings of the Revision Commissioners are next alluded to, and the Board properly take credit for successfully resisting the claim of the Chartered Company for the addition of 1s. to their maximum price for the year. They give reasons, too, for not acceding to the proposal of the company to agree upon a price for the present year, alleging that it would be out of the power of the Board to make such an investigation into the affairs of the company as would be required to convince them of the necessity for an advance of price. A satisfactory inquiry, they state, could only be made by commissioners empowered to call for books and documents, and to take evidence upon oath. They mention the notice received from the Imperial Company of their intended application for a revision, and call particular attention to the low price charged by the South Metropolitan Company.

With the quality of the gas the Board appear to be satisfied. They notice the large excess of ammonia present for some time in

the cannel gas of the Chartered Company, and add that the cause of this excess was inquired into by the Board's superintending examiner, and found to be unavoidable. The Board, therefore, did not sue for penalties. The sulphur question is referred to, and on this matter the Board now make no complaint.

A very important measure has just been introduced into the House of Commons, by the Metropolitan Board, one object of which is to consolidate the Building Acts, with the amendments required by experience. The 49th section of the Bill provides that "Every building, and every structure, and every work (to "which the Bill applies) done to, in, or on a building or a "structure, shall be subject to the supervision of the Board." The 9th schedule, however, contains a long list of buildings exempted, and among them we find, "any building belonging to "a canal, dock, or railway company, being in the actual occu- "pation of the company, and used exclusively under the provisions "of any Act of Parliament for the purposes of the company." To these exemptions may very properly be added buildings belonging to gas companies. There is not the smallest occasion for the interference of the district surveyor with these, nor can there be for the interference of the Board under this new measure. We, hope, then, that Colonel Hogg, or some member of the select committee, will obtain the insertion of the words "gas "company" after railway company, in the 21st paragraph of the 9th schedule.

We insert to-day a letter from Mr. F. J. Evans, in reply to that of Mr. R. H. Patterson, published in our last. Our own view of the propriety of Mr. Patterson, as a gas referee, taking out a patent for the use of a process which he became acquainted with in the course of his business as a public functionary, and in the pay of the companies, was intimated as soon as we read the title of the patent. We had not, however, at the time, a notion that he had patented the use of lime in any way, but thought the process claimed would be something original. When Mr. Patterson says he prepared all the reports, we presume, and understand, that he only means that he was the literary member, or "scribe," among the referees, and for that reason undertook the preparation of the reports for himself and colleagues, while performing his share of the other duties.

WATER AND SANITARY NOTES.

In their report for 1873, the Metropolitan Board of Works repeat a complaint that the Metropolis Water Act, 1871, and the regulations made by the companies, are imperfect, and ill adapted to secure the professed object of the Act, which, say the Board, was a constant supply of water under the control of municipal authorities. What the Board mean by control, we do not exactly understand. The Act is perfectly explicit as to the way in which a constant supply might be obtained; first, at the request of the Metropolitan Board; and next, by the voluntary action of the companies. It is said in this report "that it was "difficult to see how the Board could exert any beneficial influence "in securing such supply;" the simple fact being that the Board had only to make application to the company, who, subject to the fulfilment of certain conditions, were bound to furnish such supply. Thus the "beneficial influence" might be exerted by simply writing a letter. In the absence, however, of any provision for a subsequent "control" of the supply, the Board sulk; or, as they put it in this report, "refrain at present from exercis- "ing the power given by the Act of calling upon the companies "to give a constant supply." It is to be regretted that the Board have not explained what it is they desire in the way of controlling power. The report is perfectly candid in setting forth what the companies had done towards furnishing a constant supply up to the end of 1873, and also in admitting what we must regard as a certain remissness on their own part in not providing hydrants in those portions of the metropolis in which the water-mains are already constantly charged. The excuse is, "that the "question involves issues too important for the Board to proceed "in it otherwise than tentatively." So an experiment is to be made in the district of the Kent Water Company, to whom notice has been given that the Board require thirty plugs and four hydrants to be placed on the mains in the district referred to, and it is thought best to wait the result of this experiment before taking any general action; so the many miles of mains constantly charged in the East London Company's district will remain without hydrants until a few fires have occurred in Deptford and Rotherhithe.

With all that is said in the report relative to slaughter-houses and noxious businesses we perfectly agree, and believe the action of the Board to have been sensible and judicious. If sanitary regulations are properly carried out, slaughter-houses cannot be nuisances, and to drive fellmongers from Bermondsey would be ruin to thousands. All that is required for these and other noxious trades, as they are called, is stringent regulations and frequent intelligent inspection, to see that the rules are complied with.

Only a brief reference is made in the report to the new Metropolis Management Bill, now before a select committee of the House of Commons. We intended to have made particular reference to some of the provisions of this Bill, but space fails us to-day. We must, however, express, notwithstanding the strong adverse criticisms, a general approval of the measure, which we believe will come from the select committee with but little alteration. The Board must have expended an immense amount of labour in the elaboration of the Bill, and will deserve the lasting thanks of the community when it is carried.

We are glad to see an attempt being made to join in a combined arrangement for the drainage of the Solihull district with Balsall Heath and a portion of the borough of Birmingham. As to whether or not the plan submitted be the best that could be devised, we are not in a position to express an opinion. All we have to urge is that it is only by combinations of this kind that the sewage of many districts in England can be effectively disposed of.

A medical contemporary, for reasons not on the surface, takes a wicked pleasure in making people discontented with their water supply. Adopting the views of some correspondents to a local paper, an attempt has been made to show that the water supply of Hastings and St. Leonards is not so satisfactory as it might be. The water, it would seem, is, after heavy rains, a little turbid from the presence of some oxide of iron, clay, and sand, but is completely free from oxidizable organic matter, as might be expected, considering the source. The remedy is obvious enough. The water, after heavy rains, should be filtered, and then the complaints, exaggerated, no doubt, will cease. We have no sympathy with the agitators who go about the country fomenting discontent, and should be glad to see them made to pay for their officious interference; but it behoves a water company to remove, as far as possible, all cause of complaint, and the remedy at Hastings is so obvious and inexpensive, that it should be applied at once.

One of the objectors to the purchase of the Birmingham Gas Companies has, it is reported, brought forward a proposition for the purchase of the Birmingham water undertaking by the Corporation. Our readers know that he has been anticipated in this movement by the mayor, in whose hand all negotiations may safely be left. Altogether, it may be confidently expected, that, before another year has elapsed, both gas and water undertakings will have passed to the Corporation of Birmingham.

The Corporation of Southport have before them two proposals for the disposition of the sewage of the borough. "The first is to "carry it to Crowlands, there to establish a pumping-works and a "sewage farm. By means of filtration and percolation, it is ex- "pected that the sewage will be removed and rendered totally "innoxious to the town. But the farm of 49 acres needed as a part "of this system will be totally unproductive of revenue; indeed, to "get any profit from grasses grown from the present quality of "sewage, Mr. Mansergh says, 200 acres will be needed." This scheme is condemned by the reporting engineer in consequence of "a want of finality"—the farm, of course, requiring extension as the inhabitants multiply. The cost of carrying it out is estimated at £36,570. The other plan is to make the outlet at Crossens, the sewage finding its way by simple gravitation to the sea, and entering it nearly four miles from the pierhead—a distance that utterly precludes any nuisance or offence at all. No pumps, no farm, no machinery of any kind, are needed; the scheme is good for to-day and for the future. The cost is estimated at £38,850, or nearly £2000 more than the first plan. The latter scheme appears to be most approved in the borough, and is recommended by Mr. Mansergh, who thus lends his influence to the wasting of sewage.

We quote from a contemporary, more for the amusement of our readers than anything else, an account given by a surveyor of the way in which sewage works are sometimes executed under the direction of the local authority. We do not insinuate blame to the Board, whose surveyor, at the time, must have sadly neglected his duty. The locality is the notorious Spennymoor, and the writer states that he was surveyor to the Local Board during 14 months, 1871-2:—

> One of my last acts as surveyor (he writes) was to open up a main sewer in a back street to the cottages in which lived Slane, Hayes, and the others who were six months afterwards convicted of murder by kicking—their victim also living in the same cottage-row. I do not know how long the sewer had been laid, but the Local Board had only existed seven years. The sewer consisted of 9-inch glazed pipes, and every pipe was as full of the black cinder ash, with which the streets are made, as a sausage-skin is full of meat; and not one yard drain (6-inch pipes) was in connexion with the main sewer, nor ever had been. The drain-pipes were carried down to the sewer, but none of them entered a junction. In most cases there was no junction in the sewer, but the drain-pipes came against the unpierced side of the sewer, and had no connexion. In one case the junction was at the right place, but was turned skyward, and the drain-pipe touched the unpierced sewer-pipe below the junction. I give these two cases as illustrating the sanitary uselessness of a Local Board such as that at Spennymoor.

All associations having for their object the diffusion of knowledge, and the dissemination of the results of experience by personal intercourse, deserve encouragement, and we are happy to receive and publish reports of the proceedings of the Association of Municipal and Sanitary Engineers and Surveyors, at Chester, last month. A body of this kind must have a large amount of useful information at command, and its free communication can only be beneficial.

With regard to Mr. Fowler's paper, reported to day, we need only say that the treatment of waste water from paper-works, and the sewage of a town, are two very different things. Lime treatment in the one case with filtration, may, perhaps, make the water fit for use at once; but no such result could be expected with the sewage from a thickly populated district.

From our parliamentary reports it will be seen that the Truro Water Bill has been lost, and that the opposition to the Wrexham Water Bill has been withdrawn.

A TREATISE ON THE SCIENCE AND PRACTICE OF THE MANUFACTURE AND DISTRIBUTION OF COAL GAS.

XII.

Historical Introduction.

(Concluded.)

We are informed that the statement in our last number, "that Mr. (afterwards Sir John) Thwaites was chairman of the Surrey Consumers Gas Company in 1849," was incorrect, and that he never held a share in that company. Mr. Thwaites's position was that of trustee (one of three), on behalf of the consumers, that that company should never raise the price above 4s. The consumers had formed themselves into an Anti-Gas League, and had signed contracts to take the gas from the *first* company which reduced the price to 4s. These contracts were offered to the three old companies, and although tempting, they were refused.

The Surrey Consumers Company had at that time only an embryo existence, the consumers having declined to take up their shares, not more than 200 of £10 each having been issued, principally to contractors, who calculated upon executing work to the amount subscribed.

The company was formed in 1849 by the well-known Mr. Hutchinson, formerly founder and engineer of the London Gas Company, and probably with the view to its profitable sale to the older companies. This company having then no works, and only a plot of ground on the side of the railway and the Surrey Canal, accepted the terms offered by the consumers league to supply gas according to the contracts. It was then that the shares were taken up by the principal leaguers, the present chairman, Mr. Thomas Pocock, a wealthy wholesale leather dealer in Southwark; Mr. Bowditch, a substantial corn merchant, in the Blackfriars Road; Mr. J. R. Clark, vestry clerk of Lambeth, Mr. White, a grocer in Southwark, and afterwards by Mr. Beresford (now Colonel, and M.P.), Mr. Blake, a well-known Common Councilman of Farringdon Ward, and Mr. W. B. James, a solicitor in the city. From that time the concern became *un fait accompli*. Works were erected on the Thames at the Surrey Canal Dock entrance, and mains were laid, all the companies reducing their price to 4s. The public lighting was immediately thrown upon the new company, which crippled them very much, and the consumers (ever faithless!) refused to fulfil their contracts, when offered prices lower than 4s. by the three older companies. The late Mr. Thwaites, at that time a woollen draper in High Street, Southwark, was chairman of the committee appointed to secure Mr. Apsley Pellatt's return to Parliament. When the old Commission of Sewers was dissolved in 1854, Mr. Apsley Pellatt, then M.P. for Southwark, named Mr. Thwaites to Lord Palmerston as commissioner for Southwark, and he obtained his squiredom by Royal grant. Subsequently he published an able pamphlet on the sewer question, obtained a double election to the Metropolitan Board of Works, and a triumphant election as chairman of that board, even against opposing noblemen. His exertions in the public service during a period of little more than twelve years brought him to an early grave, after he had obtained his knighthood. Upon the gas question, it may be remarked that, after two years only, Mr. Thwaites, as the consumers trustee, was disgusted with his own constituents, and was glad to accept the offer of his patron, Mr. Apsley Pellatt (a director of the Phœnix) of a sop of £16,000 additional rental, in compensation for rental expected to be obtained in the borough of Lambeth, Newington, and the western part of Southwark, and Greenwich, and henceforth to confine the operations of the new company within a limited district. The three older companies contributed *pro ratâ* to the above amount, and each likewise agreed to confine their operations within a separate district nearest their own works, exchanging rental, mains, meters, and service-pipes. This scheme was concocted and carried out by Mr. Pridden, the then energetic secretary of the Phœnix Company, who was ably supported in the intricate negotiations by the then directors of that company (all of whom are now deceased), as well as by Mr. Thomas Livesey and Mr. Hinde (both deceased), the valued and upright secretaries of the South Metropolitan and London Companies. Mr. Thwaites gave way upon his deed for a 4s. price, and, owing to a sudden rise in the price of coal, 6d. was necessarily added to the price of gas within six months. Mr. Thwaites only stipulated that no rent should be paid for meters; that an analytical chemist (Dr. Letheby) should be engaged to certify every week, at an uncertain time, that the gas from each of the four companies exceeded 12 wax candles (equal to 10 sperm), the then modern illuminating power of the Great Central Gas Company; and also that a public independent meter tester should be appointed to certify the accuracy of all meters sent out, and to act as referee in case of dispute. This districting arrangement, followed by the Metropolis Gas Act of 1860, was the chief cause of all the prosperity of the gas companies of the metropolis.

Remarkable among the events of the period in connexion with our subject was the litigation arising from the infringement of a patent obtained by Mr. F. C. Hills, of Deptford. It has been observed that Mr. Croll patented the use of the oxide of iron in 1840, but the means he employed to renew this material were both troublesome and expensive, and it was therefore not practically adopted.

Mr. Laming, residing near Paris, in February, 1849, then obtained a French patent for various means of purifying gas, and in describing the process, he says, "In the fifth part of this invention I extract from illuminating gas all the sulphuretted hydrogen that it contains, by means of the hydrated peroxide of iron. The sixth part of this invention consists in renewing the hydrated peroxide of iron, after it is converted into the sulphuret of iron, by absorbing the impurities of the gas; for this purpose I expose it to the action of the atmospheric air." He also proposed to mix the oxide with sawdust and other like substance, so that the gas could pass freely through the material. Probably Mr. Laming was not aware, at the time, of the vast importance of his great discovery; but whether from this or other causes, he made no application for an English patent. Nevertheless, to him is solely due the merit of being the first inventor of renewing spent oxide by exposure to the atmosphere.

In the month of August following this, Mr. F. J. Evans, then engineer of the Chartered Company, during the progress of some experiments, remarking the altered appearance of the oxide, as withdrawn from the purifiers, and after it had been left some days exposed to the air, was led to investigate the matter, when he ascertained that the oxide was, by this means, renewed or revived, and that the same material could be used many times for the purification of gas, which method he immediately carried into daily practical operation.

At the end of November following, Mr. Hills obtained a patent for "An improved mode of compressing peat for making fuel or gas, and of manufacturing gas and of obtaining certain substances for purifying the same." The administration of the patent law at that time was very different to what it is at the present. Then, the title of a patent was allowed to be made as comprehensive as possible; no minute description of the invention was necessary in the provisional specification, and the patentee was at liberty to include anything that might occur to him between the periods of his first application, and the filing of his complete specification, so long as it could be embraced within the title of his patent.

In Hills's specification is described the means of compressing peat, the drying and warming of coals by the waste heat of the furnaces, previous to charging retorts, and other processes; amongst them, purifying gas from sulphuretted hydrogen, by passing it through the hydrated oxide of iron intermixed with sawdust or breeze, also for renovating or revivifying the foul purifying material by exposing it to the atmosphere. The similarity between the latter portion of this patent and that portion of Laming's which we have quoted, is remarkably striking, as no reference is made in the title of the former to the revivifying of the purifying material, which was the soul of the invention.

Following the operations of Mr. Evans, gas companies in general began to avail themselves of the advantages of the purification by means of the oxide of iron, under the impression, founded on the circumstances related, that Hills's patent was invalid. With remarkable boldness, legal proceedings were taken by the latter against some of the companies, and several private individuals, amongst whom was Mr. Laming.

Costly litigation ensued between the patentee and the various gas companies, which extended over nearly the whole of the 14 years duration of his patent. In some instances the difficulties were arranged by compromise, and by granting favourable licences; in others, they were decided by a court of law, and singular enough, always in favour of the plaintiff, who necessarily incurred great expenses and risk; but, with all his troubles, anxieties, and losses, the profits made by Hills, under the doubtful circumstances, were estimated at about £100,000. Not satisfied with this handsome return, he applied for a prolongation of the term of his patent, on the ground of the great advantages derived by the public and his small remuneration, which application was opposed by several of the gas companies, and, after a lengthened inquiry, it was refused, with an order that Hills should pay the sum of £1000 towards the expenses of his opponents.

The means of lighting and extinguishing all the public lamps of a district simultaneously by electricity was first patented by S. Petit in 1856, and subsequently by Baggs, Denny Lane, and others. The practicability of this is by no means doubtful, the main difficulty being the expense of laying the necessary wires; and undoubtedly the question is well worth the consideration of practical men, as by this process a saving would be effected of at least three-quarters of an hour's lighting per diem in all the public lights, being about one-tenth part of all the gas supplied for that purpose, and the number of lighters would be materially diminished, their services being then principally required for cleaning the lanterns.

We have now arrived at the period in our historical sketch when the greatest difficulties in the manufacture and distribution of gas had been surmounted, when the chemistry of the subject was better

understood, when the use of the gas-meter became universal, the follies and losses of ruinous competition made manifest, and the present comparative state of perfection in the art had been attained. And in applying the term comparative, it is with the belief that much has yet to be achieved before the science of gas lighting can be pronounced perfect; for, undoubtedly, there are mysteries in the process of the distillation of coal, and the utilization of the residual products therefrom, yet to be unveiled—secrets relating to the purification of gas yet to be unfolded, and important facts connected with the means of consuming gas hereafter to be made known.

We have arrived also at the period when reason supplanted rivalry and obstinacy in the management of business; when the directors of one gas company considered it no act of humility or submission to co-operate with directors of other companies, with the view of advancing the interests of those they represented—a state of harmony which led to the important result of the general districting of the metropolitan gas companies. From that time all have been unanimously combined to secure their common welfare, and hence has arisen the present prosperous state of the various companies.

As we have proceeded, reference has been made to some of the most important patents connected with the manufacture of gas, and we here subjoin a few remarks on others possessing less merit. As a source of obtaining illuminating gas, the following materials have been proposed by several patentees, at various times, some being subjects of several patents—viz., peat, bone, horn, wood, seeds, nuts, cocoa-nut shells, kernels, waste hops, waste cotton, tanners bark, waste soap, wool, and other substances.

As examples of repeated patents being obtained for the same object, may be mentioned those for dry regulators, with but slight modifications of the original patent of S. Crosley, which have been reproduced at least two hundred times; also the means of carburetting air, or "air gas," which has been patented almost as often. Hydrogen gas, either obtained by the decomposition of water, by the action of red-hot charcoal, or iron, or by voltaic electricity, or by magnetic electricity, has had its various patentees.

Mechanical stoking, in one form or another, has also been the subject of more patents than is generally known. The screw for charging and discharging retorts, Branton's process of hopper on mouthpiece and piston on retort, have both been patented repeatedly. Ribbed retorts, in various ways, are subject to the same observation. Respecting meters, we may remark that instruments precisely similar to the first experiment of S. Clegg, prior to his patent of 1815, have been repeatedly patented, and the various impracticable schemes which are recorded in the patent register, with the view of superseding the beautiful simple machine of S. Crosley, are almost incredible, and some of them by no means flattering to the mechanical intelligence of their authors.

Nor can we pass over some of the extravagancies and absurdities which abound in our patent register. One patentee proposes "to distil old or waste railway sleepers for the purpose of obtaining the tar therefrom with which they are saturated, for the purpose of preparing other sleepers," clearly proving that different persons have different notions of economy. Another gentleman proposes to compress gas into "a strong vessel, which may be shaped like a slop-pail, capable of containing from 12 to 30 cubic feet of gas, compressed to 3 or 20 atmospheres," the vessel to be carried from room to room for the purpose of *igniting domestic fires*. Another proposes to obtain oxygen by separating it from the nitrogen of the atmosphere by means of "*fans constructed on the difference of the relative density of the two gases*;" and the same gentleman refers to "blasts of oxygen in a pure and *electrified* state," whatever that may mean. Others have proposed "to receive the smoke at its exit from furnaces, chimneys, and other vents, by an arrangement of tubes, conducting such smoke to a vacuum or vacuums, the smoke by these arrangements being prevented from issuing into the atmosphere; also to utilize the smoke so collected for *making illuminating gas*, and for other commercial purposes."

These may be taken as a few specimens of patents which adorn our register, by no means creditable either to the authorities or to the patentees, and which suggest considerations for the amendment of our patent laws, so as, on the one hand, to prevent the possibility of absurd schemes, which excite only the mirth or contempt of persons conversant with the subject, being dignified with the name of inventions; and, on the other, the merits of real improvements being overlaid by the claims of rival patentees, to the injury of the true discoverer and the prejudice of the public.

In concluding this part of our subject, we may briefly sum up the progress of gas lighting, and its results. Prior to the application of gas for illuminating purposes, artificial light was employed merely to supply a direct necessity, and only to the extent of enabling persons to perform the most ordinary duties of life; and so meagre were the means employed at that time that, for all the higher occupations, such as reading and writing, it was necessary to approach close to the lamp or candle used for the purpose.

As an illustration of the "darkness visible" which prevailed at night even in important places of business at a period just subsequent to the introduction of gas in London, we may refer to the evidence of one of the numerous witnesses examined before a committee of the House of Commons, in 1816, on behalf of the Chartered Gas Company:—"Mr. Downs, an extensive silk mercer in Leicester Square, London, deposed that, prior to the introduction of gas, his premises were lighted by eleven oil-lamps, which had been replaced by six gas-lights, and by these he was enabled to serve his customers as well by night as by day." Such were the modest pretensions to illuminate the establishment of an extensive silk mercer, in one of the most prominent portions of the metropolis, little more than half a century ago. At the present day there are very few shops in London, of the most unpretending description, which cannot boast of having "six gas-lights," and the "extensive silk mercer" now requires ten times that number to illuminate premises of the same character as those to which reference has been made.

The demand for this description of artificial light has increased in direct proportion to the advance of knowledge and experience on the subject. The first prejudice against the adoption of gas being overcome, the removal of all fear as to its danger and insalubrity followed; its convenience, facility of use, cleanliness and economy, and the fact of its being under the most perfect control, added further recommendations in its favour, and, above all, its beauty, and the singular merit possessed by it, that almost every class of merchandise, when lighted thereby, is shown to the best advantage, led to its rapid introduction and extended use in all places of business. In dwellings, its claims to priority as an illuminating agent cannot well be overrated, while the improvements made of late years in the various appliances for its consumption—as gaseliers, pendants, brackets, globes, &c.—have made gas-fittings amongst the most conspicuous ornaments of a house; while the illumination of our public buildings and streets with gas leaves little or nothing to be desired.

The introduction of embellishments of various kinds, such as plate glass for shop-fronts and other purposes, mirrors, gilding, and similar decorations, which have now become so general, is undoubtedly due to the progress of gas lighting, for without such a mode of displaying their attractions, there would have been little use for this style of ornamentation.

In confirmation of this assertion we need only call to mind the extraordinary change which we have sometimes witnessed by the introduction of gas into some ancient continental town, with its old-fashioned open shops, which have existed in that state from time immemorial. No sooner have gas-works been erected, and a supply of gas to the streets and houses been provided, than a rapid change in the primitive state of affairs has taken place. Closed shops, plate glass fronts, and a general air of life and brilliancy pervades the streets, while elaborate embellishments, mirrors, &c., grace the interior of the premises.

Nor must we omit to refer to the advantages of gas lighting in a moral and social point of view. As a powerful auxiliary agent in the prevention and detection of crime, its claims were asserted from its infancy, and the experience of succeeding years has justified and confirmed the first impressions. The great importance attached in this respect to gas lighting is made manifest by the demand for its adoption in countries and states where civilization is not in the most advanced stages, as in many of the towns of South America, where, although the inhabitants are poor, and the cost of gas more than double the price charged in London, the public lamps are so numerous, that they are frequently placed at distances of not more than 30 yards apart, thus imposing a heavy tax and burden upon the community for the sake of attaining so desirable an object as the prevention of crime.

Darkness has always been regarded as the symbol of ignorance and crime, light as the symbol of intelligence and virtue; and it is no exaggeration to assert that the art of gas lighting has contributed its full share, during its brief but brilliant career, to aid in the rapid advance of civilization and progress.

(*To be continued.*)

Correspondence.

IMPROVEMENT IN STREET LANTERNS.

SIR,—I can testify to the value of the improvement in street lanterns, which Mr. May suggests in your issue of March 24, having used it on some of our lamps for about four years, but I have not succeeded very well in keeping the tin from tarnishing, which, of course, destroys its efficiency as a reflector. My mode of constructing the tops was to fold the tin on three sides, then slip in the glass and tack on with solder to the frame of the lantern. I never could see the use of glass in the top of a lantern, it being the earth and not the heavens we want lighted.

JAS. H. WALKER.

Gas-Works, Milwaukee, Wis., U.S.A., April 13, 1874.

PURIFICATION OF GAS.

SIR,—I beg to draw your attention to the remark of Mr. Patterson, in his letter to you in the last JOURNAL, on the question of the sulphur purification of gas, in which he says, "The author of the Handbook has very properly applied himself to the various reports on gas purification issued by the late referees (*all of which were prepared by myself*)." Of course, he must refer to the period subsequent to my resignation as one of the gas referees, for up to that time all reports were issued as the joint production of the gas referees, each giving his own practical knowledge on the subject. For so doing we were paid by the gas companies, through the Board of Trade, very handsome salaries for our services; and, what was of more importance, the gas companies gave us that practical assistance in making experiments which materially aided us in our investigations.

On my resignation as one of the referees, Dr. Pole, F.R.S., was appointed by the Board of Trade to succeed me, and it followed, of course, that all subsequent reports were issued in the joint names of Messrs. Patterson and Pierce and Dr. Pole; but we are now told by Mr. Patterson that *he* drew up all these reports, and that his co-referees had nothing to do but to agree with them. At any rate, it is quite certain that the information obtained from the gas companies of what was being done at Beckton and elsewhere was common property to all, and whatever may have been its value, it was only taken advantage of by Mr. Patterson, his two colleagues having too high a sense of honour to be mixed up with such a patent as was afterwards taken out by Mr. Patterson, while still a referee, and paid for his services by the gas companies.

Subsequent to this transaction, the Board of Trade deemed it expedient to remove Messrs. Patterson and Pierce from their office, retaining, however, Dr. Pole, and filling up the two vacancies by Dr. Tyndall, F.R.S., and Professor Harcourt, F.R.S., so that the board of referees *now* consists of three gentlemen of the highest standing, and we shall no longer hear of patents being taken out by gentlemen who, in their official capacity, have the advantage of making any experiments they think fit at the expense of the gas companies, and of seeing what the companies themselves are doing.

The whole question of this wretched patent of Mr. Patterson's will, I trust, be fully ventilated when his suit against the gas company for using their own plans is brought to a hearing, and it will not be wise on my part to say more than to request your readers to withhold their judgment until they have heard both sides. F. J. Evans.

Chartered Gas Company, Horseferry Road, May 1, 1874.

ILLUMINATING POWER OF EDINBURGH GAS.

Sir,—Dr. Wallace, in his paper read to the Philosophical Society of Glasgow, referring to Edinburgh, says, "Now, I understand, the standard of 26 candles has been adopted by both companies." The doctor has been misinformed, no standard having been adopted, and the gas supplied by us having, by our own daily tests, averaged 28·94 candles over the last six months, and 28·98 candles by tests reported from time to time to the board by Dr. Macadam. J. K. Watson, F.R.S.E.

Edinburgh Gaslight Company's Office, May 2, 1874.

THE EARLY HISTORY OF THE SURREY CONSUMERS GAS COMPANY.

Sir,—Will you permit me to make one or two corrections in the "Historical Introduction" of gas lighting, which appears weekly in your columns.

In your last issue it is stated that the late Sir John Thwaites was chairman of the Surrey Consumers Gas Company, and that in 1853, being impressed with the great losses attending the competition existing between the various undertakings, he entered into negotiations with the directors of the companies on the south side of the Thames . . . . and that the districting arrangements resulted, by which each company was limited to a particular area of supply.

I was resident engineer of these works at the time in question for Mr. Croll, who was lessee, and therefore know something of what took place, and who did it.

Mr. Thwaites was never chairman of that company—never, I believe, even a shareholder—but he was chairman of what I think was named the "Gas Consumers Protection Society," whose foster-baby the Surrey Consumers Gas Company was; and when the districting notion was proposed, as I believe by Mr. Croll and the Surrey Gas Company's directors, first to the Phœnix Gas Company, Mr. Thwaites would necessarily be consulted, in order to gain his, and, with his, the adhesion of the consumers to the proposal.

I have also a remembrance of the repugnance that Mr. Thwaites expressed of calling a public meeting of gas consumers to lay before them a scheme which, more than anything else, looked like an amalgamation of the contending gas companies, than a division of them; and Mr. Thwaites had "to be educated" into it by Mr. Croll, after which a meeting was held, and the project sanctioned.

Your notice states that of the 5000 consumers who signed to burn the company's gas, not one-fifth kept their promise, on which the directors of the company felt mortified. The company had only been supplying gas some three months before Mr. Croll, and through him I, became connected with it; and I know that for some time before I took charge the laying on of services was only restricted by the means of the company to supply gas, and that for want of gas-producing power we had to "hold our hands" for some months afterwards. This was in the early part of the year. As the days lengthened, we were enabled to connect more services, and, by the following winter, were able to meet the demands.

There is no doubt that the "districting" was one of the most rational and profitable changes that has taken place in the conduct of gas companies in our time, and that but for it the low prices at which, until recently, gas has been sold in the metropolis never could have been realized, nor would the 10 per cent. dividends, which since then have been the rule, ever have been attained.

London, May 1, 1874. George Anderson.

Birmingham Water Supply.—Dr. Hill, the medical officer of health for Birmingham, reports that the water supplied to that town during April was slightly turbid, and that its proportion of organic nitrogen was high, although its quality in other respects had improved since last month.

Securing Water-Pipes against Frost.—Mr. J. A. Calantarients, surgeon, Scarborough, has patented a simple but ingenious method of preventing water-pipes from being burst by frost. Water, in freezing, expands about a twelfth of its bulk, and within that limit the expansive force exerted is so enormous as to overcome the resistance of any pipe or vessel yet constructed. Mr. Calantarients solves the difficulty by passing through the water-pipes an india-rubber tube of such diameter, that the space inside is a little more than equal to the increase in volume of the water by freezing. There is thus secured in the inside of the pipe a space equal to the difference of volume between water and ice—the proportion being 1083 to 1000—so that when the water freezes and expands, it occupies the space thus reserved for it instead of exerting its force on the pipe. The india-rubber tube is always kept full of air, so that when the water freezes, it finds at every point the necessary space to occupy, for by compressing the tube it displaces the air and takes its place. Again, when the ice melts the air-tube expands, ready to be acted upon by another frost. The air is supplied from a reservoir, which is acted upon by the water pressure, so as automatically to put the air-tube under an exactly corresponding degree of tension. By heating the air in the tube, the water in the pipes can be thawed. This application is peculiarly useful in the case of water-closets, and in preventing the supply of cold water to engine-boilers becoming interrupted by frost. Not less important is it that the invention can be applied to preventing the explosion of kitchen boilers. There is little doubt that we have here a cheap but effective remedy against a fertile and long-standing source of discomfort and damage. Incidentally, security against the bursting of water-pipes during frost will likewise facilitate their more convenient disposition throughout a house, and permit the use of much lighter and consequently cheaper kinds; while it has been proved, by repeated experiment, that the invention retards the freezing of water in pipes, and that a frost which will close unprotected pipes has no effect upon those containing air-tubes.—*Iron*.

Parliamentary Intelligence.

HOUSE OF LORDS.

Monday, April 27, 1874.

The Lord Chancellor acquainted the House that the further proofs required by the Standing Orders Committee in respect of the Hartlepool Gas and Water Bill have been given.

Wrexham Water Bill.—Report from the Select Committee, that the committee had not proceeded with the consideration of the Bill, the opposition thereto having been withdrawn, read, and Bill committed for Tuesday, April 28.

Neath Corporation Bill.—Reported from the Select Committee, with amendments.

The Middlesborough Extension and Improvement, Hartlepool Gas and Water, and Shipley Local Board of Health Bills were referred to a Select Committee, consisting of Earl Airlie (chairman), Earl Waldegrave, Earl Camperdown, Lord Saltoun, and Lord Monteagle of Brandon, to meet on Monday, May 4, at eleven o'clock.

Tuesday, April 28.

The committee on the Broadstairs Water Bills adjourned till Monday, May 11.

The Wrexham Water Bill was reported, with amendments.

The Leeds Corporation Water, &c., Bill was reported, with amendments.

The Enniskillen Gas, Nottingham Gas and Water, Westleigh, Pennington, and Bedford Local Boards, Alliance and Dublin Consumers Gas, Ystrad Gas and Water, and Nottingham Water Bills, were referred to a Select Committee, consisting of Lord Mont Eagle (chairman), Viscount De Vesci, Lord Templemore, Lord Oxenfoord, and Lord Lyveden, to meet on Monday, May 4, at eleven o'clock.

Gas Orders Confirmation Bill.—On the motion of the Earl of Dunmore, this Bill passed through committee, and was reported without amendment. To be read a third time on Thursday, April 30.

Thursday, April 30.

Gas Orders Confirmation Bill.—On the motion of the Earl of Dunmore, this Bill was read a third time, and passed.

The Earl Amherst was proposed as a member of the Select Committee on the Enniskillen Gas, &c., Bills, in the place of Viscount De Vesci.

Friday, May 1.

The Neath Corporation, Wrexham Water, and Leeds Corporation, &c., Bills, were read a third time, and passed.

The committee on the Llanelly Gas Bill to meet on Tuesday, May 5.

HOUSE OF COMMONS.

Monday, April 27, 1874.

The Truro Water Bill was reported. Preamble not proved.

The Birmingham Gas Bill was reported. Parties do not proceed.

Report, on petition for additional provision in the Padiham Water Bill, in respect of non-compliance with Standing Orders, referred to the Select Committee on Standing Orders.

Municipal Corporations (Borough Funds) Act, 1872.—A petition for alteration was presented from Reading.

A petition for dispensing with Standing Order 130 in the case of their petition against the Belfast Water Bill was presented from the Marchioness of Downshire and the Honourable Arthur William Hill, as guardians of the Marquis of Downshire, an infant.

Requisition to withdraw petitions against the following Bills were lodged:—Wakefield Water, from Calder and Hebble and Aire and Calder Navigation Companies; Wigan Improvement, from (1) Lancashire and Yorkshire Railway Company, (2) Hindley Local Board.

Tuesday, April 28.

The following resolution, reported from the Standing Orders Committee, was agreed to:—That, in the case of the Wakefield Water Bill, petitions for additional provision, the Standing Orders ought to be dispensed with; that the parties be permitted to introduce their additional provision accordingly, if the committee on the Bill shall think fit.

Municipal Corporations (Borough Funds) Act, 1872.—Petitions for alteration were presented from York, Wolverhampton, and Hartlepool.

The Peterborough Gas Bill was reported.

Board of Trade Revision Commissioners.—Copies were presented "of certificate of commissions appointed by the Board of Trade in 1873, on an application of The Gaslight and Coke Company, for a revision of the illuminating power and price of gas supplied by them; memorandum of commissioners referring to the certificate; minutes of proceedings before the commissioners, and other papers relative thereto;" "of the like respecting the Imperial Gaslight Company in 1874;" "and of the like respecting The Gaslight and Coke Company in 1874."

A requisition to withdraw their petition against the Hythe Improvement and Water Bill was lodged by the Lords Bailiffs and Jurats of Romney Marsh.

Wednesday, April 29.

The Airdrie and Coatbridge Water Bill, as amended, was considered; amendments made; Bill to be read a third time.

The Tunbridge Wells Gas Bill was reported.

Thursday, April 30

Municipal Corporations (Borough Funds) Act, 1872.—A petition for alteration was presented from Norwich.

The Horbury Local Board and Lymm Water Bills were reported.

Friday, May 1.

Municipal Corporations (Borough Funds) Act, 1872.—Petitions for alteration were presented from Preston and Nottingham.

The following resolutions, reported from the Standing Orders Committee, were agreed to:—"That, in the case of the Belfast Water Bill, petition of the 'Marchioness of Downshire and the Honourable Arthur William Hill' (as guardians of the Marquis of Downshire, an infant), for dispensing with Standing Order 130, in the case of their petition against the Bill, the said Standing Order ought to be dispensed with."

"That, in the case of the Padiham Water Bill, petition for additional provision, the Standing Orders ought to be dispensed with. That the parties be permitted to introduce their additional provision accordingly, if the committee on the Bill shall think fit, provided that notice of the proposed additional provision be forthwith published three times in some one and the same newspaper published in the district to which the Bill relates. That a meeting of the ratepayers of the district be held not earlier than ten days after the first publication of such notice. That proof be adduced that the proposed additional provision was approved of by a majority of the ratepayers present at such meeting. That the committee on the Bill do report how far such orders have been complied with on the report of the Bill."

Petitions in favour of the Wakefield Water Bill were presented from the

Normanton, Darton, Altofts, Ossett-cum-Gawthorpe, and the Whitwood Local Boards of Health; the Rural Sanitary Authority of the Wakefield Poor Law Union; landowners and inhabitants of Thurgoland and Lofthouse with Carlton; inhabitants, landowners, and ratepayers of East Ardsley; inhabitants of Purstone Jaglin, Walton, and Featherstone.

SATURDAY, MAY 2.

A requisition was lodged by the Corporation of Chester to withdraw their petition against the Chester Water Bill.

HOUSE OF COMMONS.

THURSDAY, APRIL 23.

(*Before Mr.* MONK, *Chairman; the* MARQUIS OF HAMILTON, *Mr.* ONSLOW, *Mr.* HENRY O. LEWIS, *and Mr.* A. BONHAM-CARTER, *Referee.*)

TUNBRIDGE WELLS GAS BILL.

Mr. RODWELL, Q.C., and Mr. MICHAEL appeared for the promoters; Serjeant SARGOOD and Mr. WEBSTER, jun., for the Tunbridge Wells Local Board.

Mr. RODWELL, in introducing the bill, said he appeared with his friend Mr. MICHAEL on behalf of the promoters in support of the bill to extend the powers of the Tunbridge Wells Gas Company, and for other purposes, and in presenting the bill for the consideration of the committee he was well pleased that they were able to conduct an inquiry before an honourable member who had had such experience in presiding over inquiries of a similar character.

Serjeant SARGOOD: I wish, before my learned friend goes further, to make an application for an order for the attendance of a gentleman named Dr. Sopwith, who was recently one of the managing directors of the Tunbridge Wells Gas Company.

The CHAIRMAN: If he is required to be called, it will be necessary for some one to depose that the witness is unwilling to come without such an order.

Mr. Sopwith was then called for, and appeared.

Serjeant SARGOOD: You were recently a director of this board, who are the promoters?

Mr. Sopwith: I was.

Serjeant SARGOOD: You are not so now. It has been intimated to us that you will not volunteer to be a witness, and, as we require you, we must ask for a Speaker's order that you will attend this inquiry.

Mr. Sopwith: I would rather avoid being called as a witness.

[At the close of the day's proceedings, Mr. W. C. Cripps, the solicitor engaged by the Tunbridge Wells Local Board, deposed that Mr. Sopwith's evidence was required, and that he would not attend without an order. An order was at once granted.]

Mr. RODWELL, proceeding, said that after that little episode, which reminded him somewhat of the proceedings before the old elections committees, he must tell the court that the appeal promoted by the existing Tunbridge Wells Gas Company had for its object three purposes—the extension of its limits of supply, to hire new works, and take compulsory powers over fresh lands. He was now given to understand, however, that the compulsory powers over fresh lands had been struck out, so that the three purposes would be the extension of its limits of supply, the erection of new works, and the raising of further capital. The promoters had agreed with the Earl of Abergavenny for the land; and, therefore, it was not necessary to include the purchase of land in the bill. The history of the company was recorded in the preamble of the bill, and he did not think he need trouble the committee with that, because if Serjeant Sargood could have found anything out in it he would have done so. He (Mr. Rodwell) had the satisfaction of believing that no gas company ever came into a committee-room with cleaner hands than this company with regard to the mode in which they had managed their own affairs, the quantity and quality of the gas they had supplied to the consumers, and the reasonable price at which that gas had been charged. He, therefore, challenged his friend, Serjeant Sargood, and every one he could have at his service, to point out in any one particular that the gas company of Tunbridge Wells had failed to discharge their duty towards the shareholders and the public. He thought the committee would find that the feeling in Tunbridge Wells was strongly in favour of the parties he had the honour to represent. With respect to the history of the works, it was originally in the hands of a private individual, and in 1864 it passed into the hands of a company, and was incorporated by Act of Parliament. Of course, being incorporated by Act of Parliament, at that period all its financial condition, and all other matters connected with it, were inquired into; the amount of capital was regulated with the amounts of interest and dividends, and up to this time they had been proceeding under the Act of 1864. The first point to which he would direct attention was the extension of the limits of supply. Tunbridge Wells, as the committee, no doubt, knew, as everybody else was pretty well aware of the fact, was rather a big place, having a great many villas and residences, and was a place extending itself rapidly. The present limits of supply of the gas company did not permit them to supply a great many persons who were anxious to have the benefit of the gas. He should prove that a great many applications had been made which they could not comply with, hence this application for new works, so that they should be able to extend the limits of supply. He next explained on the plans the position of the existing works, and the proposed site. The operation of making gas was now carried on in the very heart of a thick population, and it was found impossible to extend the present works. They had, however, fortunately, been able to make arrangements with the Earl of Abergavenny, who had sold them a portion of land, and everything had been agreed upon and settled.

The CHAIRMAN: At what distance from the town is the site—the proposed site?

Mr. RODWELL: About a mile and three-quarters.

Mr. ONSLOW: Are you quite right in saying that the present gas-works are surrounded by houses in Tunbridge Wells?

Mr. RODWELL was told that they were entirely surrounded by houses. The promoters wanted to get the site which they had agreed upon with Lord Abergavenny to have, because it was extremely convenient, and possessed all the qualifications and the advantages which gas engineers and persons who carried on gas businesses required; it was removed from any population, it was sheltered, it was out of sight, it was low, and would afford no inconvenience to any neighbouring population. Although it was suggested that they would be a nuisance there, he begged to remind the gentlemen who had instructed his learned friend, Serjeant Sargood, to oppose, that they had on either side of the proposed site for the gas-works sewage operations, a sewage farm being very near at one end, and settling-tanks at the other. Assuming for the moment that the gas-works would be some nuisance, the air was occasionally so favoured with the stench arising from those sewage works that the gas would, perhaps, certainly on the score of health, be a little improvement. He was inclined to think that, so far from the works doing any harm, they would mitigate the nuisance the local board created by their sewage works. He did not think they would be able to lay any stress at all upon that portion of the case. The present capital of the company was £34,000, and there were £6 on a thousand shares still unpaid. They proposed by this bill to raise their capital, by shares and borrowing power, altogether to £122,000—share capital £100,000, and power to borrow the remainder. The removal of works to increased space was an absolute necessity, and the honourable committee would be told by the gas engineers who would be called before them that the promoters could not with any propriety carry on the works on the present site; therefore it was for this reason that they now came to Parliament to enlarge the existing works. His clients had arrived at this determination, not without due consideration, because they consulted eminent gas engineers on the subject, to see if they could, by any readjustment of their premises, make the existing place sufficient for the purposes of making gas. But, after looking at the present and prospective interests of Tunbridge Wells, they thought that the best thing they could do was to incur, once and for all, a larger expenditure, to seize the opportunity afforded them, and avail themselves of a particularly advantageous site. The site was situated at a place called the High Rocks, and the extent was 4¼ acres. These were the simple facts of the case, and one would suppose, such being the case, that the bill would pass as an unopposed bill. Those who were affected by the gas-works did not object in any way, and the only opposition they had was from the local board, and they presented themselves in a very questionable way. He hardly thought they came within (though they had got it) their *locus standi*, but that had been determined before the Committee of Referees.

Serjeant SARGOOD: You never thought of disputing it there.

Mr. RODWELL (resuming): The Local Board of Tunbridge Wells, he would repeat, came before the honourable committee in a very questionable way. The committee would, no doubt, be aware of an Act of Parliament called Leman's Act, which provided that no governing body (like his friend Serjeant Sargood's clients) should promote or oppose any bill in Parliament without the sanction of the ratepayers, and without certain formalities having been gone through. When he used the words promote or oppose, he meant it substantially—that was to say, paying the expenses incurred. Of course if these ratepayers chose to put their hands in their pockets and supply the necessary funds they would avail themselves of a right of *locus standi* as a governing body to carry out what was merely a private expression of opinion. But it should be known that on this occasion they had not gone through the formalities; they had never ventured to call a public meeting of the ratepayers to say whether they would support them or not; and, consequently, although they were present ostensibly representing the governing body, they could only expend money which was provided out of their own private pockets, their own personal resources, and they could not be looked upon as expressing the opinion of the ratepayers or constituents, so to speak, who elected the governing body. It was simply a case where the governing body had availed themselves of the right to petition as a governing body, supplying the funds out of their own private pockets. Therefore he would ask the committee to look with some little jealousy upon their opposition. Of course, had it been determined at a public meeting that the funds should be devoted to opposing the bill, then it would have had great weight; but in this instance the petitioners had never sought a public meeting, or ventured to go before one. Therefore he was entitled to ask the committee, although he could not object to their *locus standi*, to look upon them with considerable jealousy, because if they were not finding the money out of their own pockets, they were abusing the right which they had as a public body to be present upon this matter. If they were now fighting the battle for any private individual who could not himself appear, they were abusing their right. He could only treat them as individuals; and when he read the correspondence and the resolutions which were passed at the meeting to consider the question, the committee would be of opinion that they exercised a very wise discretion indeed; for if they meant anything, they meant their approval of the scheme rather than their disapproval, and that they asked for money to spend rather in promoting than opposing the bill. He next read the petition which had been presented by the local board, and commented strongly upon the several paragraphs contained in it. He submitted that they did not say one word as to the quality of the gas, unreasonableness as to the charge, or was there a single complaint as to the mode in which they had been served. In 1864 the price of gas in Tunbridge Wells was 5s. 5d., in 1865 it was 5s., and in 1870 it was reduced to 4s. 9d. It 1872 it was further reduced to 4s. 6d., and in 1873 they were obliged by the increased expenditure of labour and machinery, and the increased price of coal, to raise it again to 5s., it then being not so much as in 1864. The public lights in 1864 were 5s., but in 1865 the price was reduced to 4s. 2d., and those were the charges which had remained in force ever since. Recollecting the position of Tunbridge Wells, recollecting that it was an inland town, the rates they would have to pay for their coals and other articles, he would ask whether any person could grumble in having to pay such a reasonable price for gas of good quality, and to which no exception had been taken. He next read the preamble of the bill, after which he very much questioned whether "these amateurs," should they get possession of the works, could supply the public with gas at a lower rate than they already were supplied. Where public bodies did interfere, it had been at places where the gas supplied was of bad quality, or where the gas company had been dealing unfairly with the public, and he had yet to learn that where a gas company came before a committee with clean hands, with no complaint of any sort even hinted at, their possession should be disturbed. It might be worth the while of the gas company, as a commercial matter, to accept any reasonable offer which might be made to them, but to say that compulsory powers should be exercised over them was a monstrous proposition, considering the mode in which they had conducted their business. He next read the correspondence which had passed between the Gas Bills Committee of the Tunbridge Wells Improvement Commissioners and the gas company, upon which he also commented somewhat freely.

The CHAIRMAN: What is the maximum dividend?

Mr. RODWELL: Ten per cent. on the old capital, and on the other 7½ per cent.

The CHAIRMAN: It is proposed to raise the maximum under the bill to 7.

Mr. RODWELL: Yes, to 7; I do say it is absurd this opposition.

The CHAIRMAN: Probably we shall hear some explanation.

Mr. RODWELL said it was the greatest inconsistency and want of fair dealing on the part of those gentlemen who opposed the bill he had ever heard of. He had stated the main facts of the case, which his friend could not alter, and throughout the petition there was not a single complaint in any particular. He, therefore, asked for the extension of the powers asked for to enable the company to extend their business and works, which they had carried on, on the showing of their opponents, to the satisfaction of the public of Tunbridge Wells.

Mr. *John Read*, examined by Mr. MICHAEL.

I am secretary and general manager of the Tunbridge Wells Gas Company. I have held that appointment for the last 20 years. I am tolerably well acquainted with the affairs of the company. The present gas-works are situate on a very high level indeed. I think they are 104 feet 6 inches above one-fourth of the supply. We have been obliged to force the gas down from the elevation to the lower parts. The demand has increased very considerably. We are very much surrounded by cottages, and there are houses of a better description within 50 or 60 yards. We have no places for further enlarging our works. We purchased some cottages for that purpose in 1864. We have now no opportunity of purchasing more for manufacturing purposes. Since 1864 the population has largely increased in Tunbridge Wells. It is a progressively increasing place. The supply of gas is continually increasing. The additional increase is from 2 to 3 millions per annum. Taking that out as the per centage of the supply, it is about 12½ per cent. This would double in about 8 or 10 years. Assuming that that rate of increase goes on, we shall in a very short time be obliged to materially enlarge our works. The directors have taken the matter into their consideration, and have determined to remove the works to a better site. In 1864 the capital of the company was £20,000, £16,000 of which was paid up. In 1873 the capital, at the end of the year, was £32,000. The £12,000 additional was raised by the issue of new shares. It

was expended in additions and enlargements of the works and plant. We put in a new gasholder, a new tank, a steam-engine, &c. This was done for economic reasons. All was rendered necessary by the fact of increased consumption on the part of the consumers of Tunbridge Wells. We paid 10 per cent. dividend on the £20,000, and on the £12,000 additional capital 7½ per cent. That is about the usual amount granted to companies—10 per cent. on the old capital, and 7½ on the new. Our dividends have not varied since that time. We are authorized by the Gas-Works Clauses Act to have a reserve-fund for certain purposes mentioned, to be invested. We have invested from time to time in the public funds of the country such portion as the directors should think desirable to form a reserve-fund. The reserve-fund now is £4789 14s. 6d. We are limited to £5000.

Mr. RODWELL: How much have you invested in working capital?

Witness: £1000 would be invested in working capital—nearly £1000.

Mr. RODWELL: Is the investment £4789 or £3789?

Witness: It is £3835.

Mr. RODWELL: Then I do not think you could have given it right at first. Give the total.

Witness: £4789 is the total amount of the reserve-fund invested and the working capital included. We have competency to dedicate £5000 reserve-fund, which is to be invested. We have £3800 in the Funds, and invested in our own works £1000.

Serjeant SARGOOD: Do not call it invested.

Witness: In 1864 the price of gas for the public lamps was 5s. per 1000 cubic feet, and the price charged to private consumers 5s. 5d. That was a diminution of the public lights of 5d. The first reduction afterwards was 5s., in 1865, to private consumers. The public lighting remained the same. The next reduction was in 1870 to 4s. 9d. In 1872 it was reduced to 4s. 6d., and at that time, by our Act of 1865, we were competent to charge 6s. to private consumers.

The CHAIRMAN: What is the present price to private consumers?

Witness: Five shillings. It became an absolute necessity in 1873 to raise the price to 5s. That was on account of the increased price of coal. Generally, owing to that, there was an increased price for gas all over the kingdom; in some places very much larger than what we made. In 1865 we reduced the lamps to 4s. 2d., and that is the price now. We made no increased price for them. They had, therefore, the advantage of cheap gas during the whole of the period, though we were at additional expense for making the gas. The local board had a running contract at the time which has not terminated, and, under that contract, the charge is to be 4s. 2d.

Serjeant SARGOOD: The fact of the matter is you could not charge us more.

Witness: In 1864 the price paid for coal was 19s. 8½d.; in 1873, 17s. 7½d., and the present price is £1 5s. Of course we had the advantage in the rise in the price of coke. In 1872 the price was 19s. 6d. per ton, and in 1873 27s. 5d. per ton, and the quantity in 1872 of coke sold per ton of coal averaged 9 cwt—rather more than 9 cwt.—and in 1873, 8½ cwt. That was a large proportion. The coal of 1873 produced less coke than the coal we had previously used. The coal was not so good as in the previous year. We did not produce the quantity of coke. More was used in heating the retorts. That was general We used in 1873 400 tons more coal, and then we made three tons less coke than in 1872. In 1872 the leakage unaccounted-for gas was 22 per cent., and in 1873 it was 20 per cent. We are advised that that leakage materially differs by the amount of pressure in forcing the gas from a high level, and that that leakage will be materially reduced by erecting works on a lower level. We are also in our present site subjected to the liability of cartage. We have all the coals to cart from the station. It costs us 1s. 6d. per ton for coals, and 1s. 8d. to 1s. 9d. for other things. In the new site we shall be close by the railway, and we shall, therefore, save the expenses which press upon us at the present time. It will, therefore, be for the benefit of the public, and the private consumers of Tunbridge Wells. I may say, in diminution of the price of gas, that, after paying the maximum dividend, we are obliged by the Gas-Works Clauses Act to put the profits to the reduction of the price to the private consumer. We have a plan of the site of the proposed works. I think there will be some increase, owing to the distance from the town, in the price of coke—in the delivery. There would be no additional cost to persons fetching coke away. There would in that way be a diminished value of that residual product; but that would be more than met by the London and Brighton Company bringing the coal into the works.

The CHAIRMAN: The public would have to send further for coke, but the price of coke itself would be the same undelivered.

Witness: The price varies.

The CHAIRMAN: Do you deliver the coke?

Witness: Yes, generally. We should charge 1s. per ton from the new works more than now.

Mr. MICHAEL: Whether you deliver or no, it will fall on the consumer. It will come to the same thing if he sends his own horse.

The CHAIRMAN: Does the company pay for the siding or the railway company?

Witness: There will be an outlay. The engineers will speak to that. It will be included in the estimate. We should, by the new works, be able to supply places we now cannot supply, such as Pembury and Groombridge.

Cross-examined by Serjeant SARGOOD: I should say Pembury is distant from our present site about 3 miles. It would be about 4½ miles from the new site. Part of Pembury is within our 3-mile radius.

Serjeant SARGOOD: These are curious spots, these two places of Pembury and Groombridge, and I am anxious to follow them up. Now, the parish of Pembury, the whole of that practically—I don't mean to say the geographical outline of the place—the whole is within your 3-mile radius at this moment.

Witness: Not the whole of it. Part of Pembury is in the 3-mile radius. I am not prepared to say the substantial part is within the 3-mile radius.

Serjeant SARGOOD: Are you prepared to say it is outside. If Pembury wants your gas, can you give me any reason why you have not supplied them—assuming, for the moment, that they want it.

Witness: One great reason is that the present works are so situated that there is hardly room enough to take on those parts. We have not room enough to manufacture for Pembury. We are cramped for room, and there is little inducement to make extensions out of town.

Serjeant SARGOOD: I am not talking about inducements. On the assumption that Pembury asked for gas, I ask you why you have not given it to them?

Witness: I say our cramped position has induced the directors to abstain from any extension outside the Local Act district more than they are compelled.

Serjeant SARGOOD: Then you have constantly abstained from giving gas to people within your present radius?

Witness: If we were to supply Pembury, we could only supply part. The directors do not consider it desirable to go into the parish of Pembury unless they can secure the whole district. The directors discussed the subject, as near as I can judge, about two years ago.

The CHAIRMAN: I suppose I may infer that some application had been made from the inhabitants of Pembury for the supply of gas to that district?

Witness: Yes.

Serjeant SARGOOD: *A propos* of this part of the inquiry, what is the length of the various directions—north, south, east, and west—of your principal main? What is the greatest length of main from your present works, beginning at any point of the compass you like, within your present 3-mile radius?

Witness: About 2½ miles in the direction of Lower Green, Speldhurst. In the direction we propose to travel from our new site, we propose to go about the same distance in the north. It will be about 5 miles from extreme north to south. There would be about a mile on the west, and about 2½ miles on the east.

Serjeant SARGOOD: Then, according to that, you would be a long way off covering your proposed radius?

Witness: Yes. By the extension of power to 4 miles, I should catch Pembury and Groombrige, both of which places are very eligible for building purposes. Groombridge will, no doubt, be a very large neighbourhood some day. Looking to the future, there is every probability of the place increasing. It does not necessarily require a large amount of increased capital for the purpose of supplying Groombridge and Penbury; it is wanted for the general purposes of the company. Our present site consists of nearly an acre of ground. The works were established in 1843. We have from time to time increased those works by taking in fresh bits of ground around. That has been done by acquiring houses by purchase by agreement. The character of the property by which we are surrounded is principally cottage. There would be a difficulty in extending the works, because they are surrounded on all sides but one by roads; therefore all the cottages, except on the eastern direction, would be bounded by a road. You may purchase a strip of land of about 70 feet, and then you would go up against one of the main thoroughfares of the town of Tunbridge Wells. It would be about 70 feet by 100 feet. We have from time to time extended the works by acquiring cottages and things in the neighbourhood; but there is one great difficulty to our extending further, and that is the question of expense of purchase of land in that direction. I may tell you that for the last 70 feet by 100 feet, £700 was given. I do not know the number of cottages that were upon it. I know they were sold for about £43, which was estimated would pay the law costs. There were either six or seven. We have now 16 benches of retorts. These are principally five-retorts. That would make our total 80, but I think there is one bench with only three. There are about 80. They are 8 feet 6 inches by 21 by 14. The maximum quantity of gas we deliver in 24 hours is 300,000 cubic feet. We should require about 63 for that. I believe that was the number we had actually at work.

Serjeant SARGOOD: How many retorts are necessary for that, and for nothing beyond it?

Witness: Sixty-three, I said; but we did not work all of them last winter. I estimated the other 17 as capable of making 85,000 feet towards an additional supply.

Serjeant SARGOOD: Supposing you did not get your bill, and you had to go on with this number of retorts within your existing 3-mile radius, how many years do you think they would last you before you could not make enough?

Witness: Seven or eight. It is not only the question of retorts. I think you may say seven or eight years. Our total make of gas last year was 60 millions. There were 41 millions charged to private consumers, and 7,400,000 to the public. Tunbridge Wells paid £1800 a year, I believe. We have two gasholders. They will hold a total of 230,000. As to whether that would be ample for all purposes, engineers differed. Our consumption of coals last year was 6000 tons—6106 tons. Our sale of coke was 2659 tons. In 1871 we made 52,855,000, of which 11 millions were unaccounted for; in 1872, 57,322,000, of which 12 millions were unaccounted for; and in 1873, 60 millions, of which 12,100,000 were unaccounted for. We have three purifiers—one 13 by 9 feet, and two at 22 feet square.

Serjeant SARGOOD: Assuming you do not want to extend your radius, where is the pinch in your manufacturing powers, say for the next five or six years?

Witness: The pinch would be this, we should have to purchase ground and erect buildings, in a confined space, at a large cost; and the result of that would be, after spending a large sum of money on those works, we should have to turn our attention to other ground after seven years.

Serjeant SARGOOD: Supposing you were to put this off until next year, you would then be compelled, within two or three years, absolutely to leave that place for want of space?

Witness: Yes. If we were contemplating any large extensions on our present ground, I am quite certain the local board would immediately raise objections.

Serjeant SARGOOD: If I understand you, you say the limit of your reserve-fund is £5000, that you have put £3800 into a statutable investment, and that you have something like £1000 beyond what you have invested, which you are using for current capital?

Witness: Yes. The limit of our reserve-fund is £5000. We have dealt with less than that. That is imposed by our Act of 1864.

Serjeant SARGOOD: In seeking out a spot for your new building, of course your board were very anxious not to annoy any occupants of valuable property, or were you excluded from that discussion?

Witness: We were desirous of finding the best position for the works, and the one least prejudicial to the surrounding neighbourhood.

Serjeant SARGOOD: If I am not very much mistaken, the Marquis of Lorne has come to live within a short distance of your new spot, before you thought of going there?

Witness: The Marquis of Lorne purchased Dornden after the company had purchased that site, and with the full knowledge that they had purchased.

Serjeant SARGOOD: I am very glad to hear you say that, it shows that you have had some communication with the noble marquis.

Witness: I had it from the agent who sold the property.

Serjeant SARGOOD: But not from the agent who bought it. Are you then prepared to suggest to the committee that the Marquis of Lorne quite approves of the gas-works being put just beneath his property?

Witness: It is 1½ mile away, where he cannot see it. I had it from the agent that the Marquis of Lorne said he could not see the works.

The CHAIRMAN: That is no evidence.

Serjeant SARGOOD: Do you mean to suggest to this committee that the Marquis of Lorne has the slightest sympathy in your gas-works?

Witness: I do not think he has the slightest objection. It is 1¼ mile away from him, quite hid in a valley, and impossible for him to see it.

Serjeant SARGOOD: I am not speaking of his sight, but his olfactory nerves; the wind would drive the stink over his property.

Mr. MICHAEL: I must object to this. There is not a word in my friend's petition.

The CHAIRMAN: Is the Marquis of Lorne a petitioner?

Serjeant SARGOOD: No; but I do say it will be a nuisance to the neighbouring property.

Mr. MICHAEL: It is for the inhabitants to petition. The local board are not here to protect private property; they are only here in order to protect public rights and interests, and if persons private interests are not supported here, I must assume that their rights and interests are in no way damaged.

Serjeant SARGOOD: I cannot accept that to be the law; otherwise we should be involved in this dilemma, that if these gas-works were likely to be a nuisance to 100 inhabitants, each one of the 100 ought to petition.

Witness: We are bound to conduct our works so as not to create a nuisance.

Cross-examination continued: I have been to the site of the property the marquis has taken, and I do intend to tell the committee that, in consequence of the intervening ground and hills, he cannot see the spot. I visited the house to enable me to make that statement some four months ago. My object in visiting the house was to see whether it could be seen.

Serjeant SARGOOD: Did you visit Holmwood for a like purpose?

Mr. MICHAEL: I must take another objection. The gentleman who is the proprietor of Holmwood petitioned against this bill. We had the opportunity of

appearing before the court, but the court refused, and decided he had no *locus standi* to oppose the bill. Is it right, he having been disallowed on the ground that he had not such a grievance which would entitle him to be here before the committee, that the local board—a public body—should come in, after that decision of the referees, and take up the case in order to bring in his case after the referees specially decided he had no case before the committee.

Serjeant SARGOOD: I am rather surprised at my friend making such an objection. Mr. Heugh was told that he had no *locus standi*, that his grievance was only in common with other people, the Local Board of Health represented him, they had petitioned, and the committee did not object to their *locus standi*.

Mr. MICHAEL: That was only with reference to one point. That was first whether there was any consequential damage, and upon that it was decided he had no *locus, quâ* ratepayer. I never gave up anything on that discussion. There was nothing in his petition as a consumer of gas.

The CHAIRMAN: I think if Serjeant Sargood would have followed the advice I ventured to offer him on the part of the committee, it would be well to examine future witnesses as to any damage or as to any injury which might accrue to the owners of the adjoining properties. No objection could be taken to that line of examination, but I think it is undesirable that he should select the names of owners of particular property whose *locus standi* has been objected to.

Serjeant SARGOOD: I will ask rather general than individual questions. (To witness:) Would it not follow that the site you have chosen would have a tendency, supposing your fumes were disagreeable, with the prevailing winds, of driving those fumes through the population of Tunbridge Wells; while the site chosen on the north would have this effect, that the prevailing winds would drive it all away?

Witness: I think there are sewage settling-tanks in the southern valley, and if no person complains of smell from them, I am quite satisfied they cannot complain of the gas-works.

Serjeant SARGOOD: By the Local Government Supplemental Act of 1868 provision is made. In the event of there being found any inconvenience arising from these sewage-tanks, they would be covered up; but have you any such proviso?

Witness: The sewage-tanks have not been covered up.

Serjeant SARGOOD: Because the town has not been called upon to do so. Supposing you give annoyance, what remedy do you propose to give?

Witness: I say they could not possibly be annoyed.

Serjeant SARGOOD: In fact, you offer this as a sort of smelling-bottle to counteract the sewage impurification. How many acres do you buy?

Witness: Four acres for £1500. It will be about £300 an acre. It is a pretty fair price, and the earl is satisfied. I am not aware what would be the price per acre under ordinary circumstances. The Earl of Abergavenny cannot sell his land. I should say land would be worth nearer £150 an acre than £50. There was no other land suitable for gas-works at any price whatever. I have not heard that the local board had already fixed upon a site for gas-works on the northern farm; that they had acquired property with that view, should they ever succeed in making arrangements. It will cost the local board, to couple their site with the line of railway, four times the money the Earl of Abergavenny is to receive for this. I always understood that the local board had no power to sell their land. I think it was in May last year that we began to look out for another spot. The date of the agreement to purchase is November, I think. The solicitor will be able to answer you. Between May and November we did not communicate with the local board or with any authorities of a public character with a view of informing them of the land we were after.

Serjeant SARGOOD: Are you aware that they got no earlier intimation than your first public notice, when it was too late for them to select another as required by the statute?

Mr. MICHAEL objected to such questions being asked this witness. What was the use of asking him about the statute?

The CHAIRMAN: Do you know anything about the Act?

Witness: No; I do not.

Serjeant SARGOOD: I suppose I may take it that having communicated with no public authorities you have not communicated with any private individuals, except the Earl of Abergavenny, whose land you have taken?

Witness: No.

Serjeant SARGOOD: I am reminded of a subject you said with regard to a nobleman, whose name I will not repeat, that you had some communication with the agent of the vendor. Who is the land agent of the noble lord whose property you propose to purchase?

Witness: Mr. William Delves. He is on the local board, and is one of our directors.

Serjeant SARGOOD: Your present capital, if I remember, is £60,000, and you propose to double it. Your actual raised capital is £32,000, without exercising any borrowing powers, so that you are practically quadrupling in amount the existing capital of the company.

Witness: Yes.

Serjeant SARGOOD: That seems such a startling proposition that I give you a roving commission to justify it in any way you like.

Witness: I am not here to justify that—the engineers will be called to speak to that.

Serjeant SARGOOD: The engineers are the parties called in to support your case. What are you going to do with four times the amount of capital? What excuse can you give?

Witness: To avoid further application.

Serjeant SARGOOD: You have been in existence 31 years, and £31,000 is all you have spent by your utmost industry; and how many years more do you think it would last, supposing Parliament do not help you to any more?

Witness: Our expenditure of capital has been from £1500 to £2000 per year.

Serjeant SARGOOD: Then, as £2000—the maximum—is to the remaining £1820, your present capital will last you 14 years, if you do not extend your limits, and undertake things not required. Can you suggest anybody that would get an advantage by this increased capital except the shareholders?

Witness: The consumers. We shall be doing four times the business.

Serjeant SARGOOD: I do not see where the business is to come from. By your extended radius you would only get one village in existence and another you hope to create. Give me something less visionary than that.

Witness: I can give you no other answer.

Re-examined by Mr. MICHAEL: Without these two villages we have increased 8 per cent. in our present consumption. That is the hill [pointing to plan] which is in the intervening distance between the Dornden property and the site. I think it is 1¼ mile distant. The infirmary is within 50 yards of our present site. If there was any possibility of extending our present site, it could only be done by compulsory powers for the purchase of property.

Serjeant SARGOOD: But he said by agreement.

Witness: Not for manufacturing purposes.

Mr. DENZIL ONSLOW: How far is your site from the High Rocks?

Witness: It is within 300 yards.

Mr. ONSLOW: I think the High Rocks is resorted to for pleasure. Don't you think it would be injurious to have the gas-works there?

Witness: I think you will have evidence to show it will not be so. I cannot say myself it would. They cannot be seen from the High Rocks.

Mr. ONSLOW: I know the High Rocks are often resorted to by parties for pleasure. It would be a great pity to destroy the beauty of the place. What is the population of Groombridge?

Witness: Under 1000.

Serjeant SARGOOD: Sixteen houses. Would you kindly ask him what there is in the bill—if there is anything—to prevent them going on with the manufacture of gas in the town; whether there is anything in the bill to compel them to go away from the present works?

Witness: No.

Mr. *Robert Paulson Spice*, examined by Mr. MICHAEL.

I carry on business as a gas engineer, at Westminster. I have had 30 years experience. I have been largely engaged in all matters relating to gas undertakings. I have had experience in almost all parts of the United Kingdom. I have conducted the purchase and sale of undertakings, and have been employed as consulting engineer generally. I have acted as consulting engineer to the Tunbridge Wells Gas Company, and, as consulting engineer, have had ample opportunities of becoming acquainted with the general requirements of the town of Tunbridge Wells. With respect to gas supply, I have advised the company that it would not be in accordance with sound policy to expend further sums of money on their present site. There is no question about that. The considerations which made me come to that conclusion were, first, that the space at present available for extension of manufacture, plant, and for storeage of gas, is so very small and insignificant that it would simply be an act of folly to spend money upon it, seeing that, when the money would be spent, it would be all wasted, as it would not be wanted for five years. Five years is the limit I put of leaving it there. It would be ridiculous to expect, unless you went out of the way of an ordinary extension, by some ingenious means, such as putting the retorts upstairs, to provide for the wants of the district for more than five years. Then they would have spent, according to my estimate, £10,000. It is difficult to imagine how the works got to their present position originally. It was a very absurd act. They are on the top of a hill, so you have to cart all the solid matter uphill, and force the gaseous matter downhill. I do not think gas-works a nuisance. In a district where the manufacture is large, and the premises inconvenient, a nuisance sometimes arises, as the purifying cannot be carried on so as to avoid a nuisance, when you are constantly opening the purifiers. As a general proposition gas-works ought to be removed from human habitations. Now we have the gas-works on the hill; the consequence is we have to make 10 per cent. more gas than we need do. The leakages increase very much by the increase of pressure, and leakage for the last three or four years has been 10 per cent. I say that can be produced, and it certainly will be a saving to the general consumer, both public and private, because you can always supply the consumer more advantageously if you manufacture an article at a less cost. The loss of pressure in sending gas down to the Parade at the present time is an inch and a tenth. The pressure under which the gas is delivered into the Parade has been, and is, 24-10ths. That is required to give a sufficient light to the principal part of Tunbridge Wells. I do not mean outside residential property; it is on the Parade where the business is carried on. By giving 24-10ths full pressure, the result is that as 13-10ths only is consumed, there is a loss of 11-10ths; 24-10ths is necessary, because we are now on a hill of 104 feet above the principal point of supply. The site selected by myself is 77·6 feet below that same point, which I will call, if you please, the point of junction I propose to effect between the new main and the present system. That junction is nearly opposite the old chapel (chapel of ease); 77·6 feet is the fall to the proposed new works. Therefore, delivering gas over that low level, there is a gain of a tenth for every 10 feet rise. To give the 13-10ths pressure as it is now given, instead of having 24-10ths, we should effect the object by sending it at 6-10ths, thus saving 18-10ths. Without considering the mains being good, bad, or indifferent, that would result in a saving of 10 per cent. Assuming that the present price will be paid for a year or two, the saving in cartage and expenses connected with the delivery of coals to the storeage would be £688. The quantity of coals used last year was over 6106 tons; 10 per cent. of gas being rendered unnecessary, therefore deduct 606 tons from 6106, and the quantity left to be consumed would be 5500 tons. The carriage is now 2s. 6d. per ton in excess of what it will be; £688 in that way would be saved, and the saving effected in leakage would be £600. Then there is the economy which will result from modern appliances being used at the new works, which cannot be rendered available at the old works by reason of the very confined space. This would make, at 3d. per 1000, £625. Then taking the normal rate of increased consumption of gas at Tunbridge Wells at about 8 per cent.—it was not so much last year, but I take the last 10 years—the average increase is 8 per cent. I do say that 4 per cent. of that additional quantity saved in the first year after passing this Act would be £350. I take, in the first instance, 2s. as the price of gas, with all expenses paid; 1s. 9d. per 1000 profit on the additional 4 millions sold in the year would be £350, which brings up the total to £2263, as it will take three years to carry out this new undertaking, and at the end of that period I assume they will have to bear the burden of it. Now, I say, that being so, it is but fair to add the business that will accrue in the second year. Add £350 per annum for the second year, and there would be a total increased profit to the company of £2613. The new capital proposed to be raised is in round numbers, £30,000. I would suggest that two-thirds of it should be raised in shares with a dividend of 7 per cent., and then one-third, that is £10,000, by loans or debentures at 5 per cent. We are limited to 5 per cent. The two together amount to £1900. This would be the additional burden, but deducting the burden from the profit, a balance will remain in favour of the concern of £713. If I begin at the end of the second year after the bill, free of debts and interest on additional capital, I can begin with a saving of £713. I know very well I can get a much larger saving next year. These savings put to a reserve-fund would enable the company to reduce the price of gas much sooner than the consumers would have it if 10 per cent. of gas were wasted. That would go to the reduction of the price of gas. In order to carry on gas-works properly, the least reserve of retorts we allow is 10 per cent. I think it is time to add to the retorts, when you come to 10 per cent., that is, to have ten retorts to spare. The gas-works, with their additional retorts, might exhaust themselves in one year. You cannot always ensure a certain supply of first-class coals. It has been the case frequently, lately, while coals were so dear, to get an inferior article. Looking at the present condition of the gas-works, I should not recommend any further money being expended on the present site. I am certainly of opinion that it will be to the interest of the company and the consumers, to transfer the works to the new site. It was an exceedingly good site. If one had to be created, I could not imagine a better. Beyond all that, I was shown some land on the north of the town, and I did not consider it eligible at all, even if it could be had. It is perfect nonsense to talk about nuisance, and as to the prevailing winds, I do not care which way the wind is. It is perfect nonsense to talk about the works being a nuisance at that situation.

Serjeant SARGOOD: Your long experience I am quite willing to admit, but do you mean that gas-works, under no circumstance, can be a nuisance, or that your particular gas-works, in this particular locality, cannot be a nuisance? What you said was that it is nonsense for anybody to talk about nuisance. I do not want to talk nonsense, but do I understand you that gas-works cannot be a nuisance, or that your particular works cannot be?

Witness: You may take it as a general rule, modern gas-works are not nuisances to any neighbouring property.

Serjeant SARGOOD: You must try and inoculate Parliament with that idea, then.

Witness: There are gas-works in the City.

Serjeant SARGOOD: But do you not know we are driving them away as fast as we can.

Witness: Not because they are a nuisance. I had read some of the Tunbridge Wells newspapers, and could not help knowing of the northern site. I went and picked out the best piece of land belonging to them, but I could not make it available, except at a great expense. And, besides expense, I should be very sorry to plant gas-works there. I should have to go uphill; I should have to rise to the top of the hill, and then go down again. And I could not work at such a low pressure on the north as on the south.

Serjeant SARGOOD: I have heard a theory that pressure is not the same continuously through a pipe from the starting-point to the end.

Witness: That depends upon circumstances. We begin at 6-10ths and rise to 13-10ths. The average bulk of the supply is to the business part of Tunbridge Wells, and that would not be done so economically as from the south. I looked at the northern sewage-farm, but I do not know the spot you mean. I looked at the farm, in order to form an opinion about it. I asked for the company's surveyor to accompany me, and he showed me a spot.

Serjeant SARGOOD: Can you give me the level on the Ordnance map of the site you have chosen, and contrast it with the level of the spot we have chosen?

Witness: I can. There is a difference of about 6 feet between. I have not seen the bill to see whether there is a provision in it to carry out my theory and calculations, but I do not see why it should form part. If we chose to raise it all by shares at 7 per cent., instead of by loan at 5 per cent., there is nothing in the bill to prevent our doing so. If I begin at the end of the second year with a saving of £713, I know very well I shall get a much larger saving the next year; and these savings, put to the reserve-fund, will enable the company to reduce the price of gas. I am going on with the works without spending money.

Serjeant SARGOOD: In how many years would you reduce the price of gas?

Witness: Within two years.

Serjeant SARGOOD: What does £700 mean upon the present consumption? Something like 2¼d., I suppose?

Witness: Threepence per 1000 produces £625—that is, on the present gas sold.

Serjeant SARGOOD: We know your present consumption is 60 millions, less the unaccounted for. That you are doing with a capital of £31,000. What is the consumption you estimate arriving at before you exhaust the capital of £120,000?

Witness: It is not anticipated to exhaust that.

Serjeant SARGOOD: How much before you arrive at this elysium of reduction of price?

Witness: That is not a long way off.

Serjeant SARGOOD: How many years do you give to exhaust this £120,000?

Witness: Gas company's capital ought never to be exhausted. I should say 10, or 12, or 15 years. We are going to spend £30,000 at least in two years.

Serjeant SARGOOD: That is if you get the chance.

Witness: The Tunbridge Wells Gas Company will endeavour to produce gas at a lower rate. Their ideas are entirely consistent with the interests of the public. My first report on this matter is dated June 6, 1873. Then the question was put to me broadly, "What will you advise? This is a source of great anxiety to us. Do you advise expending money where we are?"

Serjeant SARGOOD: Talking about nuisances from gas works, is there not what I will call for the moment the manufacture of residual products?

Witness: There will be no objection to manufacturing there. It will be carried on there without being a nuisance. We have got it to such perfection now that it is not necessarily an evil.

Re-examined by Mr. MICHAEL: If you do not care for the interest of the consumer, it would be to the interest of the gas company to sell these products without taking the trouble to convert them into such things; but it is the duty of every gas company to do the best they can in the reduction of cost, and where the process can be carried on without being a nuisance I always advise them to manufacture their liquor into sulphate of ammonia. Commercial prudence would lead them to have as small an amount as possible in the way of dividend. I have never met with more trusty men than I have met in the Tunbridge Wells Company. We have been certainly driven at the last moment. We anticipated the new works by putting up two purifiers, which will be taken out and transplanted. New works are absolutely necessary.

By the CHAIRMAN: My advice is that the old works should be sold, utilized, and converted into money. I have an idea that the gasholders, or one of them, might be reserved on the hill to supply the valley beyond. That would enable us to work with a minimum of pressure from the new works, because it would require a larger pressure to send gas down there. The average rate of consumption is 8 per cent., extending over 10 years. There are 63 retorts now for the maximum consumed. According to that law of increase you use up the whole of the retorts in another year—that is to say, for the additional 8 per cent. I should want ten more retorts—but according to that, last year there ought to have been only 53 used. But last year the coals were inferior; they were forced to use more retorts.

The Marquis of HAMILTON: You say there would be a saving of 2s. 6d. per ton in the quantity of coals?

Witness: The cartage expenses now incurred in the delivery of coals into the company's store is 2s. 6d. in excess of what it will be, making £688. As 1500 is to be paid for the new site, that would go to diminish the price of gas after the first two years.

The Marquis of HAMILTON: What difference would that make in the price of gas?

Witness: In round numbers, 3d. per 1000.

Serjeant SARGOOD: As to the sale of the present site, what do you estimate the value of that property at if they did sell it.

Witness: I have formed no opinion upon that.

Mr. *Jabez Church*, examined by Mr. MICHAEL.

I have visited Tunbridge Wells, and seen the site of the present gas-works. The present site is unsuitable for gas-works. I am in very large and extensive practice as a gas engineer all over the kingdom. I have considered the site where it is proposed to construct the new works. I went round the entire town district for the purpose of selecting what appeared to my mind the most reasonable site. My attention was specially directed to the site on the south side, and also to the site hinted at in the northern sewage farm belonging to the town. Having regard to all the circumstances, I came to the conclusion that the site selected on the southern side, near the southern sewage outfall, was the best site in the neighbourhood, and I did so for several reasons. I think, in the first instance, that gas-works can be there more economically constructed, for this reason: the bulk of the consumption is on the southern side, therefore if gas was laid on the northern part they would have to force the gas downhill. Three-fourths of the consumption—the bulk of the consumption—is on the arterial main. The gas-works at the present time are suffering from the fact that they are in too elevated a position, and therefore it is necessary to force the gas down the pipes. That results in increased leakage, and consequent loss. We shall save a considerable portion of that loss of pressure, and therefore the leakage, if the works are placed on the proposed site. The leakage will be reduced to a minimum. That is a very important element, for it really makes the profit. A very considerable portion of that saving would be lost if we had to adopt the northern site. I think the leakage would be increased because of the long line of pipes, with the bulk of consumption nearly at the end. The southern site is therefore preferable. I think the gas-works can be conducted on the site proposed with ordinary care, without creating any injury to the surrounding property. There would be none whatever as gas-works are conducted at the present time. I have constructed a large number of works. I have selected isolated spots generally to build upon. The site proposed is favourably situated with respect to residential property—it is remarkably so. I think there is at once an urgent necessity for improving and extending the works.

Mr. MICHAEL: We hear that, at the present time, out of the 80 retorts, 63 are in use. How many do you put down ought to be in reserve?

Witness: Not less than two beds of retorts, making ten; that would reduce the unoccupied retorts to seven.

Mr. MICHAEL: How long would that, in your opinion, be sufficient to satisfy the increase?

Witness: I think one year would exhaust it. A succession of foggy days, or anything of that kind, or any unusual strain on the works; no doubt any exceptional case of that kind would require the whole of the retorts; and you would, therefore, have nothing to fall back upon. My experience is that, in a town like Tunbridge Wells, the increase will continue. It is universal in the history of companies for the demand to increase even where the population is stationary. In a few years gas-works will duplicate, and in some of the suburban districts of London that is reckoned upon in seven years. A place like Tunbridge Wells I should place at 10 years. The storeage capability is defective also. The highest quantity sent out last winter was 300,000. In ordinary works they require 80 per cent. storeage for the gas sent out. That would be 240. We have really now only 10,000 feet more storeage than was virtually required, and that, I say, next winter will not be sufficient. The only way to make up is to have a larger number of retorts. But here we have no retorts to fall back upon. When the necessity arises, it can only be met in that way. I have not gone through all the various heads Mr. Spice has enumerated—not through all the minor matters—but I have estimated a saving annually of £1737. There would every year be an increased quantity of supply, and, therefore, increased profit. I have not taken it prospectively. I say that, two years after the works are constructed, they will be able to supply gas at a lower rate.

The CHAIRMAN: Under the circumstances, do you think the gas company have come too soon to Parliament to ask for further powers?

Witness: I think they have come at the very right time. I think it would be a very serious matter if they postponed their operations until next session. It will take two years to complete the works. I do not think the capital is placed too high. It appears to me a very reasonable request. We all know coming to Parliament is a very expensive luxury, and this will enable the shareholders to provide for the next 10 or 15 years. I do not think that the district which is now asked is too large for a gas company.

FRIDAY, APRIL 24.

Mr. *Church*, cross-examined by Serjeant SARGOOD.

The company first had the advantage of my opinion on this matter about a month ago. I think it was towards the end of March. I can refer to the day, if you like. There are 80 retorts set in 16 ovens, 5 in each. They are D shaped, and are 21 by 14 by 8 ft. 6½ in. I rode round the entire district with a view of forming my own opinion. I was retained by Mr. Spice on behalf of the company. Mr. Spice accompanied me when I went round. The distance from that line of junction to the southern site is 1 mile 5 furlongs 4 chains, decimal 90; in yards, 2864. The distance from the northern site to the same point is 2 miles 3 furlongs 8 chains, equal to 4188 yards.

Serjeant SARGOOD: You have rather surprised me in venturing to contradict Mr. Spice, and Mr. Read, the secretary, that the company could not go on with the present works over another year without expending £10,000. My object is to delay their application to Parliament for another year. Mr. Read, the secretary, says they could go on for eight years, and Mr. Spice, the engineer, says they can go on for five, but you say they will hardly meet next winter's consumption.

Witness: And I say so still. A manufacture of any kind can be strained to the utmost limits; you may do anything, but in the event of anything failing how would it be?

Serjeant SARGOOD: In the teeth of that allegation, that there are unused retorts capable of producing equal to a third of their present consumption, you still think that they cannot make their gas for next winter.

Witness: I say in their work they will run a very great risk in the case of a retort breaking down.

Serjeant SARGOOD: You mean, generally, that by decreased pressure you will get decreased loss of gas, representing increased profit?

Witness: Yes. Three-fourths of the gas supply is to the Parade. The more draught there is in a main the more you produce the pressure. I am not aware that a gas supply extending nearly two miles is required in the northern direction, and that we must ascend a hill to give that supply. If you go a longer distance you require a larger main with increased pressure.

By Mr. SIMPSON (in the absence of counsel): I do not think the retort power is the weakest point. I think the storeage power is the weakest.

Mr. *John Birch Paddon*, examined by Mr. MICHAEL.

I am manager of the Brighton and Hove Gas-Works, and have been for the last 13 years. I am acquainted with all matters relating to the manufacture of gas, and have had 25 years experience. I know something of the present gas-works at Tunbridge Wells, and the requirements of the district. I have considered the site to which it is proposed to remove the gas-works. It is one of the most appropriate and eligible sites for gas-works I have ever met with; it has all the conditions required. It is very secluded, and cannot possibly offend the proprietors of adjoining property; its levels are very favourable indeed for the supply of the district, and it is close by a railway, so that coals will be obtained at the least possible price. On all these grounds I think the gas company are acting wisely in transferring their undertaking to the present site, and it would be of advantage to the gas consumers and the company. I have had some experience in a precisely similar case. In the year 1870 we found ourselves incapable of extending the site of the works at Hove. We had an increased demand, and no means of meeting that demand except by a very extensive reconstruction of the works, and then the money laid out would simply add to the loss, for it would have had to be abandoned some day. Consequently, the difficulty was met fully by purchasing another site and removing the manufacturing portion of the business to that site, some two miles out. When our works were originally established at Hove, there were no houses near them of any consequence, but at the present time the ground is filled with houses—very valuable houses—some with rentals of £200 a year. They have crowded in upon the works. The people viewed the works with great dissatisfaction, and it was very desirable, in the interest of the district, that we should remove our works. The result has justified the alteration. The expenditure in our case was much larger than is anticipated here. We spent £72,000, and the result is extremely satisfactory. We had to cart our coals, as at Tunbridge Wells. Now, by the sale of our residual products, and one thing and another, we get, without any reference to additional profit, sufficient to pay the whole of the dividends on the capital raised for the purpose of building the works. I am quite sure in this case they will even do better than us. We were obliged to go for an increased price, and we obtained power to charge an additional 6d. There is no parallel in the case of leakages. In the case of Tunbridge Wells there will be a great saving in the leakage. I am of the same opinion as Mr. Spice and Mr. Church that 3d. per 1000 would be saved at first; in fact, there ought to be considerably more.

If called in as an engineer, I should certainly advise them to construct modern works on the proposed site.

Cross-examined by Mr. WEBSTER: I was first consulted about Tunbridge Wells six weeks ago; at any rate, you may take it I visited Tunbridge Wells the same day as the last witness. We went with Mr. Spice by appointment. I was acquainted with the late engineer of the company, Mr. Barlow. He died the year before last. Anything put upon the northern site can be seen some considerable distance off. The southern site is almost in a hole, so to speak. I could not say anything as to the respective value of the property. The railway accommodation on the northern is decidedly not so good as on the southern. There is a siding there, but it does not extend to the site. I think it would cost £4 10s. per foot run to work a railway to the site. There would have to be 1800 feet made to get the railway to the northern site. I think I could only see one house from the site. Scarcely any of the buildings would be seen. I find that the company sold in 1864 22,162,000 feet of gas; in 1873, 47,978,000. That extended over 10 years, and I find that 8 per cent., with compound accumulations, just doubles in nine years. I do not say that the retorts were fully occupied. They would have retorts in reserve. To have a maximum of 300,000 feet, with 63 retorts, would be a very unfair thing to expect constantly. The leakage saved would be very considerable, owing to the works being on a lower level. They would be able to supply the district at a very low pressure, estimated at 6-10ths.

By Mr. ONSLOW: I cannot say anything as to the height of the chimney.

Mr. *Alfred Penny*, examined by Mr. MICHAEL.

I am a gas engineer of Westminster, and for the last 25 years have been engaged in the construction of gas-works, and been lessee for many years past of gas-works. I believe the Tunbridge Wells Gas-Works cannot be retained in their present situation. I have examined the proposed site carefully, and it is perfectly unexceptionable, both in an engineering and sanitary point of view, being totally removed from all habitations except a public-house, and I think I saw one other house only in the neighbourhood. I have taken the matter of residential damage into consideration, and cannot see anything that can possibly happen to injure any one. The site is so low, and it is surrounded by trees and foliage that will break up any fumes or smell which could come from it long before it could reach any house. The level is also very desirable, as it will be a great saving in the supply of gas, which is of great importance. It is also advantageously situated with respect to railway accommodation. They will save in this way a sum quite sufficient to provide the interest on the capital spent upon it. There is no necessity for a tall chimney, nor is it, I believe, intended to erect one. I believe the works will be invisible from every house in the neighbourhood. The only disadvantage is being removed nearly 2 miles from the town. There will be a little inconvenience in the sale of coke. I believe the gas supply in Tunbridge Wells will double itself in ten years. The extension of area is merely the question of mains along the roads. A small radius often gives rise to the establishment of small companies, as at Southborough, where the price charged is 7s. per 1000, and there is no earthly reason why that place should not be supplied by the Tunbridge Wells Company. Looking at the probable requirements of the company for future years, I cannot see that the capital asked for is very greatly in excess of what may be wanted. I was employed by the Sevenoaks Gas Company to do very much the same thing as here. The works were 120 feet above the level, but by removing the works to a lower level we were able to supply a large district we could not supply before. We have done so with the greatest advantage. We have already spent £17,000.

Cross-examined by Mr. WEBSTER: I know there is an inn at the High Rocks. Persons go to the High Rocks daily in summer, and it no doubt is very much frequented. I could only see one house. I have seen the north site. The company have pledged themselves to Earl Abergavenny not to erect any high buildings.

By Mr. ONSLOW: I do not think they ask for too much capital. I do not know that the lighting has increased very much in the northern direction.

Mr. *Henry Finlay*, examined by Mr. MICHAEL.

I am engineer-in-chief of the Surrey Gas Consumers Company, and have had 20 years experience in the manufacture and produce of gas. I visited Tunbridge Wells for the purpose of this inquiry, and have inspected the existing and proposed sites. I am favourable to the proposed site, because of its being near the railways and its levels being good. Works properly constructed could not be of injury to residental property. I have constructed a retort-house within the past twelve months with dwarf chimneys. There is no necessity whatever that there should be a stack.

By Mr. WEBSTER: From 30 to 33 feet would be the height of the retort-house, I do not know that the surrounding residents would be likely to complain. I have seen the northern site, but I do not like it. The works on the present site are thoroughly defective. I cannot see that they are in any way in a safe position to make 300,000 feet. It is a very unsafe position for a company to be in.

Mr. *Ebenezer Goddard*, examined by Mr. MICHAEL.

I reside at Ipswich, and am consulting engineer to a great many companies. I have inspected the works at Tunbridge Wells, and certainly should not agree with spending any more money on the present works. The southern site is the most eligible. Not the slightest damage could accrue to residential property. I believe the gas consumers would be greatly benefited.

Cross-examined by Mr. WEBSTER: The south is far preferable to the northern site. I do not consider the difference in levels of 6 feet material, but on the northern site you would have to go up a hill and down again. The larger proportion of supply would be available from the southern site.

Mr. *T. H. Driver*, examined by Mr. MICHAEL.

I am an auctioneer and surveyor of 4, Whitehall, and during the last 25 or 30 years have had great experience in land. I have inspected the proposed site, and no residential damage could arise from the gas-works.

By Mr. WEBSTER: Residential damage could arise in the northern site. Considered they had not paid too much for the land.

Mr. *George Longridge*, examined by Mr. MICHAEL.

I am an auctioneer and surveyor of Tunbridge Wells, and been in business there for five years. Know the spot selected in the south, and no residential damage to surrounding property could arise.

Mr. *Thomas Ladds*, examined by Mr. MICHAEL.

I am surveyor at Tunbridge Wells, and been in business there for 12 years. The ground proposed to be taken is a very suitable place for gas-works, and no damage can arise to property adjoining.

Mr. MICHAEL objected to the northern site being mentioned as an alternative scheme, when nothing was mentioned respecting it in the petition.

The Committee adjourned for some time, to consider the point, and then said that had Mr. Michael put the objection earlier they should have decided with him; but he had himself examined some of the witnesses on the same question.

MONDAY, APRIL 27.

Mr. *George Homersham*, examined by Mr. PEMBROKE STEPHENS.

I am in business in Tunbridge Wells as a coal merchant, and am acquainted with the coal business and its working in Tunbridge Wells. It is part of my business to be well acquainted with the railway rates for coals, and the best mode of supplying the town. There are two railways, the Brighton and South Coast and the South-Eastern. I formerly had my coals brought by the South-Eastern Railway, and had a wharf for that purpose. I have now a wharf at the Brighton Railway. The company solicited me to come that way. We get our coals 2s. per ton cheaper by the Brighton line than we do by the South-Eastern. Of course, the Brighton line gives a through rate, and the South-Eastern take them from Redhill, for which they charge half a crown into the Wells. We get them direct from the collieries in trucks. That is owing to the fact that the Brighton Company have a through rate by lines bringing the coals from the collieries. The South-Eastern do not give a through rate. I often have coals left for other stations on the South-Eastern line, and the rate is 6d. difference. I leave them at Redhill for 6d. less than I should have them brought to Tunbridge Wells by the Brighton line. Then there is the rate, 2s. 6d. per ton more from Tunbridge Wells, and more according to the stations below. In bringing coals from the collieries to Redhill, and from there to Tunbridge Wells, by the Brighton line, there would be a saving of 2s. I know the site proposed for the gas-works of the company. That site, in my opinion, is well situated for the purpose of coal supply; it is close to the railway. A very short siding would place the site in communication with the Brighton line. I think, looking at the site and its position, it is one well suited for the purposes of gas-works. Knowing the town, I do not consider that any injury to it would arise from the erection of gas-works at that spot. I could only see one house from the place within one mile from the site.

Cross-examined by Mr. WEBSTER: I get coal from Durham, some from Claycross, and different collieries. I get coal from Derbyshire and Durham—from Claycross I get a deal. I supply private consumers. I get very little seaborne coal from Whitstable and Rochester. At present the company have theirs chiefly by sea. There is not much difference whether they get it by land or sea. They have for some years got it from Whitstable. Six or seven years ago, when the Brighton Company first opened their station, I was first solicited to go to them instead of the South-Eastern. They had not much trade at that time. They asked me if I would bring my coals on their line. They had quoted me a through rate. If the South-Eastern take London and Brighton coal to Redhill, and bring it along their line from Redhill to Tunbridge Wells, they charge 2s. 6d. Direct through from London, the distance is a little shorter by the South-Eastern, but they do not go to Redhill. I know the distance through Sevenoaks and Chislehurst. I was a little of opinion for the north site before I saw the other. I thought they had ground close to the railway, but finding that they had not, and that the other site is six or seven feet lower, I changed my opinion, and supply the coals from the railway. I visited both places, but finding they would have to cut through other properties for a siding on the north, which would cost them a very large item, I thought it would be a great disadvantage to the north.

Mr. WEBSTER: Can you mention a single other property that they would have to cut through to get coals on the northern site?

Mr. STEPHENS objected to the question on the ground that he had limited his examination strictly to the south site.

The CHAIRMAN thought the witness ought to answer the question.

Witness: I preferred the south to the north site because it had better railway communication and better means for supplying the gas. The better means was that it was 7 feet lower than the north. I have said something that the gas-works ought to be put on the north side of the town. I thought it was their own land quite up to the railway, but I find it is not. I do not remember saying exactly that if it was their own land right up to the railway the gas-works ought to be on the north side of the town. The town was about taking the gas-works, as I understood, and it was their ground close to the railway. I thought instead of their buying ground it would be to their advantage to have it there if the local board took to the gas-works. I did not say definitely that in my judgment the gas-works ought to be on the north side of the town. I did not say that in my judgment the north side of the town was the better site for gas-works. I scarcely had an opinion upon the matter. If the town took the gas-works, and they had land close to the railway, I would still recommend the north site.

Re-examined by Mr. STEPHENS: I am not an engineer, but I thoroughly understand coals. The coals brought by the South-Eastern Railway are coals in a great measure coming from Strood and Erith. Those are ports on the South-Eastern system. At present the existing works of the company are nearer to the South-Eastern Railway, and conveniently supplied from there. Assuming that the works were constructed on the south site, they would be much nearer the Brighton line, and more conveniently supplied from there—more conveniently than they are at present supplied from the South-Eastern Railway.

Mr. STEPHENS: As a matter of fact, would the coal which would be obtainable by the Brighton line at the south site be more desirable for the gas purposes than the coal which is now got from the South-Eastern?

Mr. WEBSTER objected to the question on the ground that in the examination in chief the witness did not go into the question of the relative merits of the two coals.

The CHAIRMAN stated that the committee considered the question a fair one arising out of the cross-examination.

Witness: The same coal could be obtained with a through rate direct from the colliery, and come in better condition, without any moving, and greatly to the company's advantage, and at a reduction in price. The same coal could be had at the southern site by the Brighton line at 2s. a ton less, and in better condition.

Mr. *John Kirby Pain*, examined by Mr. STEPHENS.

I am a corn and coal merchant at Tunbridge Wells. My wharves and warehouses are in connexion with the system of the Brighton Railway. I know Tunbridge Wells and the country round very well. I know the proposed southern site. From the opinion I have formed, I think the construction of gas-works in that place would not be liable to be attended with injury or annoyance to Tunbridge Wells. I know the position in the valley. The works would certainly be visible if you went to look for them. They would not be such a conspicuous object in any way as to be a nuisance. If they want more room, it would be decidedly advantageous to remove the works from the present site to the proposed site. I get my coals generally by the Brighton line. I find an advantage in doing so. From the general coal districts of the midland and north of England the advantage is about 2s. a ton to the Brighton Company's station, against the South-Eastern, for through coal. I know the South-Eastern system and their way of getting coal. The Brighton line has a through rate, and the South-Eastern has not. The South-Eastern line brings principally seaborne coal. Undoubtedly coal carried landwise would come in better condition than seaborne, as well as at a cheaper rate. A siding could be made to the Brighton line, but I do not know much about railway works. The distance is very short. Assuming a siding is made to the Brighton line, the company would save a considerable sum of money in cartage. I had the gas contract, and paid 1s. 6d. per ton for cartage from the South-Eastern.

Cross-examined by Mr. WEBSTER: Anybody in Tunbridge Wells can buy the coals of the London and Brighton 2s. a ton cheaper than they can by the South-Eastern, if they come by the through route. The Derbyshire and Midland coals are brought to Tunbridge Wells 2s. a ton cheaper than you can get them by the South-Eastern Railway. The gas company or anybody else cannot get seaborne coals by the Brighton Railway. There is not the slightest reason why the gas company should not get their coals now by the London and Brighton. Undoubtedly there must be some other reason which induced the gas company to get their coals seaborne through Whitstable and Rochester. The cartage from the Brighton station to the gas-works would involve 1s. 6d. a ton more than from the South-Eastern. I offered a man to cart my coals, when I had the contract, 2s. 6d. from one and 1s. 6d. from the other, and he accepted the 1s. 6d. I cannot answer that, as a matter of fact, seaborne coals are almost invariably used whenever they can be got for the purpose of making gas. I am a tenant of Lord Abergavenny's. I have never expressed an opinion with reference to the site on which the gas-works ought to be. It was ten days

ago, perhaps, that I was first asked which I thought the best site. I had nothing to do with the selection. I had some coals by the South-Eastern three weeks ago. They were from Erith. Sometimes I have had trucks sent to the South-Eastern in mistake, and I have always had them sent round, because I would never take them there. My business is chiefly in inland coals. I supply private consumers. I do not think the works would be invisible. If people went to the High Rocks I should think they would not see them; if they passed the spot, of course they would.

Re-examined by Mr. STEPHENS: The High Rocks are a place for pleasure visitors, but residents go and enjoy them too. If the works were at the southern site, they would be, in fact, almost upon the Brighton line; but at present they are at a considerable distance from the Brighton line, and all uphill. I offered the man his choice whether he would take 2s. 6d. from the Brighton line, or 1s. 6d. from the South-Eastern. He took 1s. 6d., and therefore he considered it worth 1s. more to cart them from the Brighton station to the company's works than from the South-Eastern. I am a tenant of Lord Abergavenny's for about 80 acres, but that would not a bit influence my opinion in any way. I have never had any communication with Lord Abergavenny or anybody belonging to him on the subject.

Mr. *James Booty*, examined by Mr. STEPHENS.

I am a silk mercer and draper in extensive business on the Parade, Tunbridge Wells, the centre of the town for business purposes. I know the present position of the gas-works, and, being in the centre of the town, I should say they ought not to be retained for gas-works purposes.

Mr. WEBSTER: It is common ground with us both that, sooner or later, the works ought to be removed.

Witness: I know the southern site. I should say the removal of the gas-works to that site is not one that will be attended with the evils which we have heard suggested. It is quite in the valley, and entirely surrounded by a large amount of foliage. Gas-works in that position would certainly not be an injury to the town of Tunbridge Wells. I know the Parade and all about it well. I do not think that the gas-works on the site proposed would be any injury to the Parade or the people there. Unquestionably, I should be directly interested in that question, and no doubt one of the first to feel it. I do not think the gas-works, as proposed, will detract from the beauty of the High Rocks. My reason for expressing that opinion is this, that I have been to the High Rocks, and I could only find one spot inside where it could be seen; and my impression is that, when the foliage is out, nine-tenths of the people that go to the High Rocks, unless they were told, would never know that the gas-works were in that locality. In the winter time they might, but certainly not in the summer. I do not know much about buildings, but I should think they would never extend thickly into that quarter—it is quite in the valley. It is between the tanks and the sewage farm. As a resident, and one knowing Tunbridge Wells well, I think the proposals of the gas company as to the site are reasonable.

Cross-examined by Mr. WEBSTER: Possibly a smell or smoke coming from the gas-works would be perceptible at the High Rocks. I was on the Tunbridge Wells Board for five years, and we used to sit with the windows open. We were, I apprehend, at the same distance off as the High Rocks would be, and we did not experience any inconvenience. The board meets at Calverley Street. I was first asked to give evidence as to the High Rocks site about ten days ago, probably. I do not think anybody asked me whether it was preferable to the other. Mr. Reed asked me what my impression was. I did not attend the public meetings. I only know the resolutions passed from what I read in the paper. I believe there are some inhabitants of Tunbridge Wells strongly opposed to the south site. I do not think the subject has been brought before me half a dozen times.

Re-examined by Mr. STEPHENS: I think the opinion is about equally weighted. I can hardly say how near the office of the local board is to the existing gas-works of the company—probably 100 yards, or it may be a little more. I certainly did not experience inconvenience myself. I was a pretty frequent attendant at the meetings of the board. I apprehend the works of the company were conducted with all due care. Very frequently in Tunbridge Wells we have warm weather, and open the windows—and warmer discussions. I never remember experiencing any inconvenience with regard to the gas-works.

Mr. BONHAM-CARTER: Do you happen to know the distance of the proposed site from the High Rocks?

Witness: Probably 200 to 300 yards. I cannot say.

Mr. BONHAM-CARTER: Is it over 200 yards?

Witness: I should hardly think it is from 200 to 300 yards.

Mr. ONSLOW: We have had it in evidence that the proposed site is 4¾ acres; and also we have had it in evidence that at the present time the land is very wooded. You say one reason why these works would not be seen is on account of the foliage; are you aware that will all be cut down?

Witness: I am told not on this side.

Mr. ONSLOW: It is in the contract that the sale of the wood is reserved to Lord Abergavenny?

Witness: A portion of it.

Mr. ONSLOW: Therefore there may be a great deal of wood to be cut down?

Witness: A portion; but I am told that the trees on this side will not be interfered with. I do not think that there would be the prejudice that is generally thought. I went specially again on Saturday night in order that I might convince myself, and I looked in every position, and the impression that I formed was that the major part would not be aware of the fact of the works being there in the summer time. I do not know how many acres of wood would have to be cut down—how much of the 4¾ acres.

Mr. WEBSTER: The distance from the door of the inn at the High Rocks to the nearest point of the site is 154 yards.

Mr. STEPHENS: The exact measurement to the centre, where the retort-house will be, is 230 yards.

The CHAIRMAN called the attention of Mr. Stephens to the fact that there was no evidence with regard to the company requiring as much as 4¾ acres.

Mr. STEPHENS said he believed the condition with regard to Lord Abergavenny's property was that the land taken should not be split up, but that the boundary line should be followed.

Mr. *Thomas Sewark*, examined by Mr. STEPHENS.

I am the proprietor of the Swan Hotel, on the Parade at Tunbridge Wells. I am also the occupier of two farms at Hamsell, which is 3½ miles from Tunbridge Wells. The two farms are 130 acres. I know the whereabouts of the sewage-tanks of the local board. I last year entered into a contract with the local board, in reference to those tanks. That was for the removal of the solid matter which they contained. The removal of the contents depended very much on the weather—it averaged about twice a week. That was all through the year. I carried the matter to the farm. I carted it along the roads. I took it along the road which passes the High Rocks and the new site of the gas-works. This refuse had a very strong smell. I had to remove it as often as it was thrown out. I paid for the throwing out. Until there was sufficient thrown out to be removed, it lay upon the table—the platform by the side of the tank. The liquor went back into the tank. The table by the side of the tank is provided for the purpose. It has to be there for a certain time to dry, and then it is put into the waggons and taken away. Notwithstanding the drying in that way, it retains its offensive smell. This sewage might be smelt a long distance—half a mile or more. That is when in the waggons, and passing along the road. This system is a necessity—it has to be done from the position of the sewage works. I am not the contractor now. It is going on now. Complaints have been made of this by persons whose houses were passed by the carts. Mrs. Dean often complained of it to my men, and said she would not allow them to stay there. I do not know much of the gas-works, but I have seen them. Comparing the operations of gas-works with the removal of the sewage matter, there is nothing so offensive in the gas materials as in the removal of the sewage. I do not know much about a smell from the tanks themselves, but there is a great smell from throwing the sewage out. The stronger the smell the better the manure. I do not know anything about the establishment of the gas-works on the southern site being an injury to the town. I have no wish to see the local board purchase them. I have no wish either way.

Cross-examined by Mr. WEBSTER: I do not know much about gas-works.

Mr. WEBSTER: That is the reason why you were brought to give us evidence about them, perhaps. You were the contractor for the removal of the sewage?

Witness: I was. Complaints were never made by Mr. Lewis on behalf of the local board on the ground that my men with their carts let them stand in the road, and thereby caused a nuisance. I had not signed any contract. I do not remember being told that I must remove it without making a nuisance in the course of removal. I do not remember being told that if I had contracted to remove the sewage I must remove it without creating a nuisance in so doing. I do not remember having received any such notice. I will undertake to say I did not. I have had notice to say that the solids must be removed from the tanks—it is impossible to remove it in open waggons in wet weather. I was under no obligation to any one to remove it. I do not know, but I think the present contractor does not remove the stuff in covered carts. Mrs. Dean and her bailiff have complained of nuisance from the tanks themselves, and their being thrown out. The complaint was that the sewage was left lying on the platform outside the tanks, and not removed. I have had notice to remove it when it was lying by the side of the tanks. I cannot answer as to the present contractor. The tanks themselves are not covered. I did not know they can be ordered to be covered if a nuisance. It was not my business, and I did not know it.

Re-examined by Mr. STEPHENS: I contracted to do the emptying of the tanks and the removal of the contents. I suppose the platforms were erected by the local board. When the matter is taken out it is in a semi-liquid state. It is impossible to cart it away until it had laid a certain time. Unless it was removed in carts hermetically sealed, it must smell—a rough road would shake it about. Apart from any question of cartage or removal or delay, the mere emptying of the tanks is a most offensive operation.

Mr. ONSLOW: How far are these tanks from the high road from Tunbridge Wells?

Witness: I should think about 200 yards.

Mr. ONSLOW: How near did the carts pass the High Rocks?

Witness: They passed the front door, between the High Rocks and the inn.

Mr. ONSLOW: You said that the smell from the sewage could be perceived half a mile; how far do you think that the combination of gas and sewage could be smelt?

Witness: I do not know.

Mr. ONSLOW: Do you not think that the combination of the two would often be smelt?

Witness: I cannot tell. They would not be pleasant together. I do not speak of the gas—that is no matter to me. I have often heard it said that the gas-works ought to be down there.

Mr. *Robert Paulson Spice* recalled, and examined by Mr. STEPHENS.

I am aware of the circumstance under which it was proposed to take the quantity of land which the bill proposes for the purposes of these works. When I saw the site the first time, it struck me as being admirably adapted for the purpose, and not at all too large for the present and the prospective requirements of the company. I have had to do with many such towns before, and I have seldom known less than five acres to be allowed for works to supply such a population for such a district. I know a nearly corresponding concern, which occurs to my mind at this moment, and that is Kingston-upon-Thames; and there the works only occupied about three-quarters of an acre some years ago, when I first had to do with them, and we took power to buy five acres, exclusive of the site then occupied. That company has been to Parliament since, and I think it will be found, on reference to the Kingston-upon-Thames Gas Act, that they now occupy something like eight or ten acres; that they have that, and that they are nearly occupying the whole; and so I think it may be here. I think it may be wise to reserve the site of the old works, selling only that off-portion which had been recently acquired by the company, retaining in operation, it may be, one of these gasholders, and retaining the bulk of the site of the present manufactory. So that in the event of those five acres, or four and three-quarter acres, proving to be insufficient as years roll on—and not a very great many, say ten or fifteen—then a gasholder station of larger dimensions may be put upon the site of the old works. I think it would be extremely unwise that the company should be limited to less than that portion which they have agreed with Lord Abergavenny to purchase. There is one observation I should like to make before I leave the subject, and that is to explain to the committee the great advantage it is to a gas company to have plenty of good room for the storeage of coke. It sometimes happens that when coal is dear, coke is cheap, and that has been the case in London to a remarkable extent. In the past winter there have been thousands and thousands of tons of coke stored by the London gas companies for the want of a sale. A mild winter has come in, and before the coal has come down coke has been found to be a drug in the market.

The CHAIRMAN: But was not that in consequence of the high price of coke?

Witness: No. Coke has been sold by the Chartered Company at 7s. 6d. per chaldron in large quantities, when they ought to have had, according to the price of coal, double the price.

The CHAIRMAN: I am paying 27s.

Witness: At the present moment the storeage in those works is so extremely limited that the day's make of coke must be sold by the Tunbridge Wells Gas Company, let the price be what it may; and that which is an inconvenience to the company is an inconvenience and an injury to the consumer. No inconvenience could arise from mere storeage power of coke, nor from the possession of five acres of land. The company would naturally only build and extend their works as the occasion required. I cannot conceive any objection to the small quantity of 4¾ acres which is here asked for.

Cross-examined by Mr. WEBSTER: I advised the negotiation of the purchase of 4¾ acres of land, but I did not negotiate it myself. I myself proposed to take 4¾ acres. The boundaries were pointed out. I am aware that there is a power in the bill for the leasing of lands. I do not contemplate taking further lands there. I believe there is no land available. I have not referred to anything more than the 4¾ acres on the south side.

By Mr. ONSLOW: I do not consider that gas-works are any possible source of danger to a populous neighbourhood.

Mr. ONSLOW: Would you consider that the gasholder which you propose to leave in Tunbridge Wells would be any danger?

Witness: No; gas is not any danger unless mixed with common air.

Mr. BONHAM-CARTER: It is the production of the residual products that causes the nuisance in a gas-work, is it not?

Witness: It depends upon circumstances; the manufacture of residual products is so conducted now, that really it might be done, and is done almost in the centre of the town, almost in the centre of Cambridge, so as not to cause a nuisance.

Mr. BONHAM-CARTER: But if there is any objection?

Witness: It would be absurd to do it. I would not, for instance, advise the

manufacture of residual products on their present works. It could not be done without committing a nuisance; but it would be no nuisance under such arrangements as we should have. We should have space and opportunity of providing on the new site.

Mr. *Edward Durrant*, examined by Mr. STEPHENS.

I am a wine merchant and grocer on the Parade, Tunbridge Wells. I am well acquainted with the town and its requirements. I know the proposed southern site, and I believe gas-works in that position will not be of the slightest injury to the town. From my position on the Parade, I should be one of the first to feel any serious inconvenience if any arose from gas-works. Notwithstanding the suggestions I have heard, I consider the company are reasonable in proposing to erect their works on the new site.

Cross-examined by Serjeant SARGOOD: I know that there was a difference of opinion on this subject. I was invited to come here and express my opinion by Mr. Read a fortnight ago.

Re-examined by Mr. STEPHENS: I have not the slightest connexion of any kind or sort with the gas company.

Serjeant SARGOOD: I do not impute that. Do not imagine that I intended to.

Witness: Mr. Read knew my opinion before he asked me. I had never concealed my opinion. I had expressed it openly before I knew I should be a witness here.

Mr. STEPHENS: That is the promoters case.

FRIDAY, APRIL 24.

(*Before Mr.* BATHURST, *Chairman; and Messrs.* BASS, BACKHOUSE, *and* RITCHIE.)

TRURO WATER-WORKS.

Mr. LITTLER, Q.C., and Mr. M'KELLAR appeared for the promoters; and Serjeant SARGOOD for the Corporation of Truro, petitioners against the bill.

Mr. LITTLER, in opening the case for the promoters, said the object of the bill was to supply the town of Truro with water at a cost of £16,000, for that was the amount of capital, with borrowing powers of £4000. That was a very moderate scheme, and a very small expenditure, and one would have thought that those interested in the prosperity of Truro would have accepted it. The borough at present was supplied by a very odd process—partly by wells and partly by diverting a small stream called the Kenwyn River, which ran through Truro, and was allowed to run down the gutters, and the inhabitants were compelled to get their drinking water out of the gutters. In 1862 a scheme was proposed to supply the town, but it came to nothing. In 1868 another scheme was proposed called the Stairfoot scheme, and it passed into law in 1869. The company was called the Borough of Truro Water Company, but although that company had existed since 1869, it had done nothing at all except call a few meetings. Not a single penny of the capital authorized to be raised by the Act of 1869 had been raised, and on the 29th of June in this year the powers of that company would absolutely cease. That being the case, Mr. Symons, being desirous of seeing a supply of water obtained for the town, pressed the matter on the attention of the old company, and the consequence was that an engineer was engaged to carry out the scheme, and a number of gentlemen joined together to promote it. Shares had been taken up already to the amount of £8000—half of the capital—and those gentlemen were perfectly prepared to find the rest of the capital. The notices having been served by the old company on the landowners, it was proposed in the present bill to take powers to purchase or abandon those lands, so that the landowners should not receive any injury. The works proposed to carry out the present scheme were a pumping-station near the town, from which the water would be pumped into a service reservoir which would hold two days supply, and from there the water would proceed through the mains to the town. Truro was well surrounded with water, but the difficulty was that in every stream the water was more or less contaminated from the fact of there being copper and sulphur mines in the neighbourhood. But the Milltown stream, from which it was proposed to take the water to supply the town, contained water that could be used for domestic purposes. A public meeting had been called in Truro in favour of the scheme; and when the meeting took place every member of the corporation attended, and had an assurance cut and dried that the scheme was not a very satisfactory one. The corporation presented a petition against the bill; but their principal allegation was that the corporation, as the urban sanitary authority, ought to have charge of the water supply. But the promoters were willing to put a clause in the bill enabling the corporation to purchase the works. The corporation also objected to the bill on the ground that it was inexpedient to give the promoters power to break up the streets; but the corporation were quite aware that the promoters would have to leave the streets in as good a condition as they found them. Although the corporation said they were the proper persons to have charge of the water-works, he did not believe that they intended to promote any scheme.

Evidence was then taken in support of the bill.

Mr. *Robert Symons*, surveyor, of Truro, said he had taken an interest in all the water schemes which had been proposed for the town during the last 30 years. The present scheme was the best, in his estimation, that could be devised for the purpose. The mines were on the opposite side of the town from which the present bill proposed to take the water.

Mr. *Matthew Courtney*, one of the auditors for Truro, proved that nothing had been done by the Town Council with regard to the water supply.

Mr. *Richard Skinner Hitchins*, late harbour master of Truro, was called to prove that water-works were required at Truro.

Mr. *G. F. Carlyon Simmons* (the owner of Trevella House, St. Erme), a director and promoter of the company which was proposed to be established under the present bill, gave evidence with reference to the scheme of 1869, which, he stated, fell through for want of capital. He believed the present scheme would prove a paying one. He was a subscriber towards the present scheme, and he believed that £8000 of the capital sought to be raised had already been subscribed.

Mr. *William Shelford*, engineer to the proposed works, said he had carefully considered the matter, and had chosen the proposed scheme because he believed it to be the best that could be devised. The estimate for the works was £13,500.

Mr. *James Henderson*, C.E., said he had first considered the question of supplying Truro with water in 1866. He considered it again in 1868, issued a prospectus, and tried to raise the capital. He believed the reason the capital was not subscribed was because the people could not afford it. At the end of last year a number of gentlemen took the matter into consideration again, and Mr. Shelford was sent for, and devised the present scheme. He believed this was the best scheme that could be adopted. From his knowledge of the district he had no doubt there would not be the slightest difficulty in sinking a well where it was proposed, without injury to the stream.

Mr. *D. Campbell*, Fellow of the Society of Chemists, proved that he had analyzed the water taken from the stream, which was of good quality, and free from contamination by decayed vegetable matter.

Mr. LITTLER asked the committee to amend the bill by limiting the time for the completion of the works to three instead of five years, and to limit the time for the compulsory purchase of land to two years instead of three.

This completed the case for the promoters.

Serjeant SARGOOD then addressed the committee on behalf of the Corporation of Truro. He asked the committee not to make Truro the victim of a speculative bill for the third time. This was a genuine London experiment to —he was going to say, plunder the Corporation of Truro—but, as that was a very strong term, he would say it was an attempt to enter into a speculation, and get the Corporation of Truro to indemnify them.

The committee desiring to hear what the corporation had done in respect of water-works, Mr. *Francis Hearle Cock*, town-clerk of Truro, was called to give evidence, and the committee then adjourned.

MONDAY, APRIL 27.

Mr. *Cock*, town-clerk of Truro, was recalled, and cross-examined by Mr. LITTLER. He said the first actual steps with regard to the opposition to this bill, and the Town Council's own scheme, were not taken until December last. The Town Council passed a resolution on the 12th of December, determining to oppose the bill, and declining the offer of the promoters. There was some delay on the part of the corporation applying to the Local Government Board, in consequence of the dissolution of Parliament.

Re-examined: The dissolution of Parliament deprived the Local Government Board of its head, and prevented the Corporation of Truro from receiving an answer to their application until the 16th of March.

This completed the case of the Corporation of Truro.

Mr. LITTLER then briefly addressed the committee in reply to the case of the corporation. He said the calling of Mr. Cock had established a state of things rather in favour of than against the promoters. The corporation had said they had not power to take any steps with regard to supplying the town with water until the passing of the Act of 1872; but, if the corporation had chosen, they could have constituted themselves the sanitary authority any time since 1848, and prepared a scheme for the advantage of the town. He characterized the course taken by the corporation as a dog-in-the-manger kind of opposition, and said the promoters had been treated very unfairly, and had been kept entirely in the dark with regard to the proposed scheme of the corporation.

The CHAIRMAN: In accordance with your desire, we have not gone into the scheme of the corporation.

Mr. LITTLER said, when the corporation said they had a scheme before the Local Government Board, the promoters had been entirely taken by surprise. There was no allegation in the petition of the corporation with respect to any alternative scheme, and for anything the committee knew the scheme of the corporation might be an unreasonable and impossible one. He asked the committee to pass the preamble, and suspend the powers of this bill for six or nine months, in order to see if the Local Government Board approved of the scheme of the corporation, and if not, to give the promoters power to proceed with this bill. He asked this in the interests of the town, as all the promoters required was a guarantee that Truro should be supplied with water.

The room was then cleared whilst the committee deliberated. On the re-admission of the public,

The CHAIRMAN said: The committee are of opinion that the preamble is not proved.

The bill was therefore lost.

Serjeant SARGOOD: It is now my business to make a further application with reference to the costs the corporation have been put to.

The CHAIRMAN: Is it worth while to go into that?

Serjeant SARGOOD: Of course the committee must be unanimous to give costs.

The CHAIRMAN: The committee are not unanimous.

Serjeant SARGOOD: Then I will not trouble.

The application was therefore disallowed.

Legal Intelligence.

COURT OF QUEEN'S BENCH.—MONDAY, APRIL 27.

(*Sittings in Banco, before the* LORD CHIEF JUSTICE, *Mr. Justice* BLACKBURN, *and Mr. Justice* ARCHIBALD.)

LESTER *v.* THE CORPORATION OF HALIFAX.

Mr. WILLS, Q.C., and Mr. TAPPING appeared in support of an application to change the *venue*.

This was an action against the corporation, as proprietors of the gas supply of the town of Halifax, to recover compensation for the consequences of an explosion of gas which destroyed the plaintiff's mill. He had already received £50,000, and claimed nearly £40,000 more, altogether claiming nearly £70,000. The plaintiff was anxious to accelerate the trial of the cause, and with that view applied to change the *venue* to London.

Mr. Justice BLACKBURN said that as there were as many as 70 special jury cases, remanets, to be tried at the sittings, the case would be tried sooner at the assizes, as it could hardly be tried at the ensuing sittings.

Rule refused.

Miscellaneous News.

SINGAPORE GAS COMPANY, LIMITED.

The Annual Ordinary General Meeting of the Shareholders of this Company was held at the London Tavern, on Tuesday, April 28—H. P. STEPHENSON, Esq., in the chair.

The SECRETARY (Mr. R. King) read the notice convening the meeting, and the following report and statements of account were presented:—

The directors have the satisfaction of reporting continued progress in the lighting of Singapore, for particulars of which they refer to the report annexed, from their engineer and manager, Mr. E. J. Wells, dated Feb. 16, 1874.

The directors going out of office by rotation are: Messrs. Henry Palfrey Stephenson, John Nicol, Alexander Erskine Stephenson; and these gentlemen, being eligible for re-election, offer themselves for the support of the shareholders. The present auditors, Messrs. William Thomas Morrison, and Alfred Williams, retire from office according to the articles, and, being eligible for re-election, offer themselves to the shareholders for that purpose.

The balance-sheet to Dec. 31, 1873, and appended to this report, shows the financial position of the company. The directors have written off for depreciation of works and plant, and off the expenses of first establishment, as per balance-sheet, at the rate of 1 per cent. per annum. The profit for the half year after writing off these sums, amounts to £1768 12s. 2d., which together with £38 5s. 10d., the unappropriated profit of the preceding half year, makes the available balance £1806 18s. Out of this sum the directors recommend the declaration of a dividend at the rate of 7½ per cent. per annum on the preference capital, and 7 per cent. on the amounts paid up on the original capital, less income-tax; the balance of £62 4s. 2d. to be carried forward to the profit of the succeeding half year.

The dividend to be payable on the 20th of May.

REPORT OF ENGINEER AND MANAGER.

Gas-Works, Singapore, Feb. 16, 1874.

To H. P. Stephenson, Esq., Chairman, and the Directors of the Singapore Gas Company, Limited.

Gentlemen,—I have again the honour to forward you, *viâ* Southampton, the several statements of accounts and balance-sheets, showing the working for the half year ending Dec. 31, 1873. The accounts that are submitted I hope you will regard as satisfactory, and that they will be found correct.

Notwithstanding the increase in the price of coal, labour, and in fact everything connected with the production of gas, which I feel assured is well known to those connected with its manufacture in England, it will be satisfactory for the directors to see that we have been enabled to maintain the profits, and to show an increase over last half year by nearly £70 on this side, which would have been augmented had it not been for the unfavourable rates of exchange for remittances.

The progress made in the consumption of gas has been satisfactory, showing an increase over last half year in the rental of 996·84 dols., including illuminations.

During a portion of last half year coke was all sold at good prices.

The whole of the accounts having been fully prepared in the usual way, giving all details, I beg to refer you to them for all the information on the general details, it being unnecessary for me to take up your time by going into figures.

As regards the question of coals, the arrangement upon the whole for the present year is satisfactory. The *Adelaide* and the *Hope*, mentioned in my last report, safely arrived, and in addition, the *George Shotten*, which was chartered in Australia, at 30s. per ton freight. Our present stock of coal will take us well through the year. Another ship has been taken up at an easier rate, being 5s. per ton less for freight; this vessel may be expected about April, so that for the present year we have no anxieties as to our stock of coals. The price of coals in Australia remains the same, 14s. per ton, f.o.b.

During the half year the only addition to capital account has been the proportionate allowance for new services and new meters.

The expenditure in the carbonizing department has been for the ordinary wear and tear.

All the buildings, plant, &c., have had their annual examination, repairs have been executed where necessary. Gasholders and all the iron work have been tarred, and the general apparatus is in good condition for produce and supply.

All is still working satisfactorily in the purifying department, and the illuminating power has been maintained without the use of cannel coal; at the same time I would remark, it is not safe to be without some in stock, and I am in hopes the next ship will bring some shale from Australia. The order has been given now nearly eighteen months; they having ceased to work the mine, it could not be executed. By last Australian advices another has been opened, producing shale of good quality, stated to produce 17,000 cubic feet per ton of 30-candle gas.

Engineer's report furnishes all details in this department, the unaccounted-for gas is 12½ per cent.

Collection of rental has been satisfactory, as out of the amount due on the half year, say, 34,464·11 dols., 33,450·12 dols. has been collected and paid to bank.

Bad debts and allowances are below the last half year, and the arrears of rental, &c., about a month's accounts.

The fitters during the half year have been fully employed, there being a steady increase in new houses lighted. Increase in lights for the half year, 461.

The fitting staff at present have more work on hand than can be carried out. For the past ten days we have had to devote the whole of the fitters time to the Chinese, in alterations, additions, &c., to be prepared for their new year, which commences to-morrow, 17th inst. In addition to this we have the new post-office, Government printing office, and other houses to be lighted, and also a number of additional lights to fix.

The new extension ordered is the laying of the main from Cross Street to the Tanjor Pajar Wharf, the Municipal Commissioners having ordered on this line of road 30 new lamps to be fixed. Some portion of this will be brought into work during the present half year, there being sufficient mains in stock for about two-thirds of the distance, and for the completion we shall have to wait until the arrival of the mains and lamp columns, &c., from England.

In conclusion, I do not know that there is anything more of importance to lay before you on the present occasion, than to say at the close of the present half year I trust we shall be able to show an improvement on the rates of exchange upon remittances to England.

I have the honour to remain, gentlemen, your obedient servant,

E. J. WELLS.

Balance-Sheet, Dec. 31, 1873.

Dr.		*Cr.*	
Capital—		Cash at bankers	£3,293 13 6
£5 paid on 2000 pref. shares	£10,000 0 0	Ditto in hands of secretary.	3 15 8
5 „ 7829 ord. ditto	39,145 0 0	Bills receivable	1,000 0 0
2 „ 25 „ „	50 0 0	Office furniture	159 14 6
1 „ 570 „ „	570 0 0	Cost of works and plant, as per last statement . . £32,911 7 0	
10,424 shares.	£49,765 0 0	Add extensions during half year . . . 208 15 0	
Debenture bonds	7,620 0 0	£33,120 2 0	
Sundry creditors	5,140 12 8	Depreciation at the rate of 1 p. ct. p. annum. 164 12 2	
Insurance reserve-fund . .	34 15 10		32,955 9 10
Profit and loss	1,806 18 0	Purchase of land	1,118 2 8
		Retort account	804 13 1
		Meter renewal account . .	190 14 2
		Stock on hand	10,476 7 11
		Amts. charged to capital for travelling expenses, rent, preliminary expenses, and interest on capital during construction . 10,840 5 11	
		Less amt. previously written off. . . 391 13 3	
		10,448 12 8	
		Less amt. written off during this half year, at the rate of 1 p. ct. p. ann. 54 0 0	
			10,394 12 8
		Gas, meter-rental, fittings, and sundries under collection to Dec. 1 . . .	1,266 14 7
		Gas, meter-rental, &c., for the month of Dec., and gas for public lamps for the half year	2,277 15 8
		Sundry debtors	251 5 0
		Travelling expenses, suspense acct., and sundries.	174 7 3
	£64,367 6 6		£64,367 6 6

Profit and Loss Account, from July 1 *to Dec.* 31, 1873.

Coal carbonized	£2,733 16 6	Balance at profit and loss, June 30, 1873. £1,782 19 8	
Lime and oxide	17 12 6	Less amt. declared as dividend, after deducting income-tax on ordinary and pref. shares . 1,744 13 10	
Trade and general charges.	241 18 5		£38 5 10
Rent, rates, and taxes . .	86 7 10	Gas and meter rental . .	5,250 10 8
Directors and auditors . .	205 5 0	Products, profit on fittings, and sundries	1,464 15 10
Salaries and collector's commission	550 10 10		
Wages	333 14 5		
Int. on loans and debentures	307 13 6		
Loss on exchange	112 10 2		
Bad debts and allowances .	43 13 0		
Retort account	50 0 0		
Meter renewal account . .	30 0 0		
Depreciation on works and plant, and expenses of first establishment written off.	218 12 2		
Office furniture	5 0 0		
Trving. expenses, susp. act.	10 0 0		
Balance—profit for appropriation	1,806 18 0		
	£6,753 12 4		£6,753 12 4

The CHAIRMAN: Gentlemen, I have now to move—"That the report and balance-sheet attached thereto be received, adopted, and entered on the minutes." And in doing so I have but few observations to make. We have now arrived as a company at a position of dull monotony—paying the same dividends on each occasion; and when I say "dull monotony," I do it for the purpose of congratulating the shareholders that we are still able to pay 7 and 7½ per cent., for, unfortunately, many gas companies, suffering under the effects of the late coal crisis, have not been in a position to pay their accustomed rates of dividend, and, in some instances, have paid no dividend at all. There is one very large British gas company I have in my mind at the present moment, who, the previous half year, were in that position, and, last half year, not only paid no dividend, but made a loss out of their transactions. That is a company with a gas-rental of between £70,000 and £80,000 a year, so that you see the coal crisis, and other causes, have had a very serious effect upon them. Under these circumstances it is a matter of congratulation that we are able to meet you to-day, and recommend the declaration of the same rate of dividend that we paid before. I do not propose to trouble you by going through the balance-sheet and profit and loss account, but if any question arises in your minds respecting them I shall be happy to reply to it. There is only one point to which I need refer. You will see by the profit and loss account that we have suffered, as other companies have done, from the high price of coal. We have also suffered from the high rate of freights from Australia. Our coal has cost us about £400 more than it did for the corresponding half of last year, while there has been an increase of only £186 in the gas and meter rental. The other items of the account are very much the same, with the exception of the "loss on exchange," which is £92 more than in the corresponding half year. I may say that the directors have the hope that the extensions which Mr. Wells refers to in his report at the Tanjor Pajar Wharf, and the laying of mains there, may lead to a considerable increase in the gas-rental. The dock itself will be lighted up; there are 30 new lamps, and there are several houses on the road which will be supplied, so that when the extension is carried out, we have reason to expect that the increased rental will be more than proportioned to the outlay which it has occasioned.

Mr. FOREMAN seconded the motion, which was put and carried unanimously.

The CHAIRMAN moved—"That a dividend be declared on the preference shares at the rate of 7½ per cent. per annum, and on the ordinary shares at the rate of 7 per cent., less income-tax in both cases, on the amounts paid up on such shares, and that such dividends be payable on the 20th of May next."

Mr. FOREMAN seconded the motion, and it was at once agreed to.

On the motion of Mr. RICE, the retiring directors and auditors were re-elected.

The CHAIRMAN moved—"That the thanks of the shareholders be given to Mr. Wells, the company's manager and engineer, at Singapore, and also to the local committee for their continued and careful attention to the affairs of the company." He said that during the last years these gentlemen had had many difficulties to contend with owing to the state of the coal market, and at one time it was almost a question whether they would not be left entirely without a supply. Happily that difficulty was now removed, though the company had still to pay a high price for coal. He was sure the shareholders would cordially concur in the proposed vote of thanks.

The motion having been seconded, was put and carried unanimously.

Mr. RICE inquired whether fresh capital would be required for the purpose of the extensions.

The CHAIRMAN said not for that purpose alone; but the directors contemplated calling up some capital to clear off a portion of the bond debt, which they looked upon as rather large in proportion to the shares. There were 570 shares, with £1 each paid up, and 25 shares, with £2 each paid up. The directors proposed to make a call on these shares, or even to issue a few more, with £1 each paid up, so as to provide for the paying off of some of the debenture bonds as they became due.

Mr. RICE thought it would be a good plan to call up the existing capital before issuing any new shares.

The CHAIRMAN said the board would, no doubt, take that point into consideration. There were about £700 of bonds due in 1874, and £1200 in 1875; the remainder would not accrue until a later period.

Mr. RICE proposed a vote of thanks to the chairman and directors, which was duly seconded, carried, and acknowledged.

A vote of thanks was also given to the secretary for his services, and Mr. KING having briefly responded, the proceedings terminated.

CONTINENTAL UNION GAS COMPANY, LIMITED.

The Half-Yearly General Meeting of the Shareholders of this Company was held at the City Terminus Hotel, London, on Tuesday, April 28—W. T. FAWCETT, Esq., in the chair.

The SECRETARY (Mr. E. Garey) read the following report:—

Your directors beg to remind you that at the present period of the year they can do no more than present a short report of proceedings since the annual general meeting held in October; the accounts, as you are aware, being made up only on the 30th of June in each year.

The high price of coals, which has so largely affected all industrial undertakings, and especially gas companies, had not been felt to its full extent by this company for some time after the great rise took place, owing to the favourable contracts previously made; but when these expired, it became necessary to provide for current requirements, and although prices had then begun to fall, they were still considerably in excess of those paid formerly, under the contracts referred to. Consequently, the additional cost of coals has been an unusually heavy charge on this year's accounts.

The value of coke has, in many cases, improved in a fair proportion, but not sufficiently so to afford compensation for the large extra expense on coals.

The rates of exchange with Italy have been very disadvantageous to the company, and the loss suffered under this head will be found much greater than during the previous year.

Your directors have, however, the pleasure to state that these unfavourable circumstances are, it is believed, of a temporary character, and are, in fact, already passing away, the price of coal having fallen continuously from week to week for some time past, with a tendency to further weakness, and the rates of exchange having recently become more satisfactory.

This ground for encouragement is strengthened by the growing nature of the company's business, which affords a fair prospect of great future prosperity. The sale of gas is increasing at the various stations, and the additional consumption at several of the most important establishments will probably be very large.

In order to manufacture the additional quantity of gas required, extensions and improvements on a large scale are indispensable.

At Genoa, the tank, 120 feet in diameter, already reported to the shareholders as in course of construction, has been completed; and the gasholder, to be placed in it, is now in preparation; a new retort-house has been erected, with retorts set therein, and further works will have to be executed very shortly.

At Strasburg additional exhausters and boilers must be fixed in the course of the summer.

The new plant and mains at other stations have been on a considerable scale, but more equally distributed, and of less magnitude in each, than at the principal establishments of Milan, Genoa, and Strasburg.

Your directors not being in a position, as already explained, to ascertain exactly the state of the accounts for the year in the course of which such heavy additional charges have occurred, feel some hesitation in recommending the rate of interim dividend, but as this is only a payment on account of the full division for the year, they consider it prudent to keep the amount within such limits, as may be easily extended at the annual general meeting in October, if it be thought advisable then to do so.

They have therefore resolved to declare an interim dividend for the six months ending the 31st of December last, at the rate of 4 per cent. per annum free of income-tax, payable on Monday, the 4th of May next, together with the dividend on the preference shares.

The CHAIRMAN: Gentlemen, I have a light duty to perform to-day compared with that which falls to my lot on other occasions, because, as you are aware, we are not able to furnish any accounts at this meeting, and the dividend we propose to declare is only an interim dividend. As you have already heard,

that dividend is not so large as we should like to have declared, but in case it should so happen that our profits on the whole year are larger than we have estimated, we can easily rectify this matter at the next meeting. I hope it will then be my duty to propose to you a more satisfactory dividend, but, of course, I do not promise. I have no means of doing so. There are two items referred to in the report from which our misfortune as to the present lower dividend has arisen—these are, first, the price of coal; secondly, the rate of exchange. During the whole of last year the exchange was violently against us, but within the last month, and, markedly, during the last fortnight, there has been a considerable alteration, and it is now becoming more favourable to us. This is a most important matter in connexion with our affairs, because as our income is getting very large, the more money we have to send over while exchanges are unfavourable, the more your dividend suffers. There is, however, good hope that, for the benefit of Italy and for ourselves, the rate of exchange is becoming more satisfactory. As to the question of coals, we have had an unfavourable time also in respect of them, and when we come to multiply the advance in price per ton upon the many thousand tons we necessarily purchase, it becomes a very serious question. But you will be pleased to know that we are at this time laying in coals, or making arrangements for so doing, which will cost us about one-half of the highest price that we were obliged to submit to during a portion of last year. I do not propose to go into any details upon other matters; in fact there is nothing to say to you with regard to them. At the annual meeting we shall, in all probability, have a report to present which will be more satisfactory to you—satisfactory as to the future certainly, if not for the time being. We are looking forward with great hope; ours is a very large company, with a great number of stations, and when matters go in our favour they will go as greatly favourable to us as when they are adverse they go against us. The directors are, therefore, full of hope with regard to the future, although in reference to to-day they are not in a position to pay you such an interim dividend as they could wish. We are ourselves personally interested to a very large extent in the company, and we have no hesitation in saying to you that we believe our prospects for the future are unquestionably very good. With these remarks, I shall move that the report be received and adopted, and that the interim dividend which we are able to give you be declared.

Mr. White seconded the motion. As the chairman had stated, the company had had many adverse circumstances to contend with in the past year. Coals had been not only very difficult to purchase, but extremely high in price. He hoped, however, they had now seen the last of that. Coals which they had been obliged to purchase to fill up one cargo, at 23s. a ton, he had no hesitation in saying they could now go into the market and buy at 10s.; therefore the extreme difficulty against which they had been working was now considerably ameliorated. With regard to the exchanges, the chairman had pointed out the position in which they were placed; but they were in almost daily hope that exchanges would be much more favourable than they had been, which would be a most important consideration for the company.

A Shareholder said he recollected that, on the last occasion, the chairman informed the meeting that the high price of coal would not interfere with the company so much as might have been expected, because they had a large stock in hand; though, no doubt, they would be obliged to buy some at the advanced rate. Taking that statement into account, and knowing the high price the directors obtained for coke, he felt a difficulty in understanding the remarks just made by the chairman. He was afraid there was mismanagement somewhere, especially as he found that, while the shares in other companies were going up, the shares of the Continental Union were falling in the market. If he did not see some improvement before the next meeting he should move for a committee of investigation. Looking upon the company as a trading concern, in which the shareholders and directors were alike interested as partners, he thought there should be no concealment of affairs. But there was one matter which had not been brought before the meeting. He understood that the company had sustained a great loss.

Mr. White: What do you mean?

The Shareholder said he understood the company had been robbed by one of their officials.

The Chairman: No.

The Shareholder said it was so stated in the newspapers; and, if not true, the report should have been contradicted. It had been publicly reported that the company had been robbed by one of their Italian servants.

The Chairman: With regard to this matter, it so happens that Mr. Fennessy, the late secretary of the company, is present, and I will ask him to be good enough to give an explanation. The loss you speak of is a loss sustained by the company about six years ago, and it has been long since written off and forgotten.

The Shareholder: I do not want there to be any secrets in the company.

The Chairman; There are no secrets; but you cannot suppose it possible that the directors should bring before the general meetings of shareholders every little thing that happens at the various stations.

Mr. Fennessy: With reference to the inquiry of the honourable proprietor, no doubt he is right in saying that he has seen a report in the newspapers about a former officer of the company, a man named Malvisi, who was recently apprehended in this country and sent home to Italy, to complete a term of 10 years penal servitude. That man did, six or seven years ago, rob this company. The amount was considerably under £1000, and it was written off the profits when the shareholders were receiving 8 per cent. dividend. As a matter of fact, I may say that the losses which this company have sustained from robberies by servants have been ridiculously small, and have not averaged £100 a year. This man was an official at Parma, and his defalcation was found out through the audit clerk.

Mr. Stokes fully sympathized with the directors in reference to the difficulties they had had to encounter, while he congratulated the shareholders that the result of the past year's affairs was as good as reported. He knew of two companies which were not able to pay dividends at all, and therefore, although the Continental Union could only declare a small dividend, the shareholders were in a better position, and might hope, with the reduction in the price of coals and with more favourable exchanges, that before long they would resume their former prosperity. He believed that, with a more settled state of matters in Italy, a strong Government, and all things tending in the right direction, the rates of exchange would be considerably more advantageous than they had been.

Mr. Andrews said he regretted very much the tone and manner in which reference had been made to the defalcation of a former officer of the company; but the mention of it opened up an inquiry in his own mind, as a young shareholder, which he thought he was justified in putting to the board—viz., whether care was taken to obtain satisfactory guarantees for the integrity of the servants of the company. The interests at stake were very large, the stations were at a considerable distance from England, and the directors could exercise no personal control over the management. It should, therefore, be an invariable rule to require, before officers entered on their duties, that they gave, as in most corporate companies was given, valid security for their integrity. With regard to coal, the question was a most important one, because it was the material upon which the company had to depend for their profits. The gentleman who seconded the motion, stated that the directors were now buying coals at 10s. a ton.

Mr. White: 10s. 6d.

Mr. Andrews asked whether he was to understand that the directors were fortunate enough to be in a position to buy best Newcastle gas coals at that price?

The Chairman: The answer, no doubt, is that we can buy coal sufficiently good for our purpose.

Mr. Andrews said he had bought many thousands of tons in his time, and he had come to the conclusion that the lowest priced coal, especially with high rates of freight, was by no means the cheapest. And he was, moreover, clearly of opinion that, unless the directors had discovered a much better market than he ever heard of, they could not purchase best gas coal at 10s. 6d.

Mr. White: We can buy at 18s., as your company have done.

Mr. Andrews said what his company could do was nothing to the point. What he wished to state was that, for an additional 1s. or 1s. 6d. per ton, coal might often be purchased of a quality that at the end of the voyage would be worth 4s. or 5s. more for the purposes of the company. He would, therefore, suggest that the directors should not always be influenced by price, but let quality be well considered.

The Chairman said the directors were under obligations to the last speaker for the lesson he had given them with regard to the purchase of coal, but he must take leave to say that, as the honourable shareholder was connected with a company having works abroad, he might have been a little more forbearing on the present occasion. The directors asked for no favours for themselves—they were as much interested in the success of the company as the proprietors at large—but they felt that it would be kind if a little forbearance were shown towards them when difficult circumstances arose. If he was rightly informed, the company with which the last speaker was connected had not been much more fortunate than the Continental Union. All he could say was that the directors endeavoured to conduct affairs to the best of their ability, and to meet in the best way they possibly could the great difficulties with which they had had to contend. It must be remembered that they had a large number of stations to control, that the constitution of the company was peculiar, and that there had been several adverse circumstances of late which interfered with the ordinary course of affairs; and though they could not expect, on presenting a less favourable report, and recommending a smaller dividend than usual, that they would get any credit for their services, he thought he was justified in asking a little forbearance on their behalf. He had already stated his firm belief that they were now entering upon a new and better state of things, and he trusted they might be permitted to do so in a good spirit. The directors were all deeply interested in the concern, and were endeavouring to make it successful. They asked no favour at the hands of the proprietors, but they did ask that they would assist the board by giving them their confidence instead of carping at them for misfortunes in the past year which they could not prevent.

A Shareholder asked what was the present amount of capital upon which dividend was paid, as compared with six months back.

The Chairman said it was between £50,000 and £100,000 more.

The motion was then put and carried.

On the motion of Mr. Stokes, a vote of thanks was given to the directors, which the chairman acknowledged, and the proceedings closed.

COLLINGWOOD, FITZROY, AND DISTRICT (AUSTRALIA) GAS AND COKE COMPANY.

The Ordinary General Half-Yearly Meeting of the Shareholders of this Company was held at the Company's Offices on Wednesday, Jan. 23—the Hon. George Hurker, M.L.A., in the chair.

The Secretary (Mr. Vasey) read the following report of the directors:—

It is gratifying to your directors to be able to present a financial statement which must be satisfactory to every shareholder, more especially as during five out of the six months the price of gas has been reduced from 10s. to 9s. per 1000. Consequent on increased business, your directors have taken steps to provide for an increased production, which, with the continued extension of the mains, involves the necessity of issuing more shares, and you will be called upon to authorize such an issue. A dividend at the rate of 10 per cent. per annum, with a bonus of 1s. per share, is now recommended out of the profits. You will be called upon to re-elect Mr. J. W. Hines as one of the auditors, no other candidate having offered.

Balance-Sheet.

Dr.		*Cr.*	
Paid-up capital	£85,000 0 0	Works, apparatus, meters, &c.	£157,530 9 5
Debenture bonds	42,500 0 0	Material in store	2,344 14 11
Interest on debenture bonds	2,240 0 0	Coal in store	3,845 15 9
Sundry amounts owing by the company	3,122 11 6	Lime in store	25 6 2
Contractors securities	500 0 0	Sundry amounts owing for gas	8,199 1 8
Wear and tear	8,619 8 2	Ditto for coke	1,228 15 3
Bills payable	884 16 10	Balance in banks	1,351 0 0
Dividends and bonus unclaimed	70 10 0	Cash in hand	480 11 11
Reserve-fund account	24,500 0 0		
Insurance-fund account	1,250 0 0		
Profit and loss	6,418 8 7		
	£175,105 15 1		£175,105 15 1

Profit and Loss Account.

Coal carbonized	£1,720 10 10	Gas rates	£24,424 18 5
Lime used for purifying	429 0 0	Coke and tar sold	5,088 6 9
Allowance to directors	300 0 0	Sales of old material	64 19 3
Auditors fees	10 10 0	Transfer fees	6 14 6
Officers salaries	1,371 2 6		
Rent of office	110 0 0		
Rates and taxes	204 0 1		
Law charges	109 5 8		
Printing and stationery	157 14 10		
Advertising	33 14 0		
Wages—			
Storeman	78 0 0		
Stokers	1,576 15 0		
Labourers	717 18 11		
Inspectors	703 13 0		
Repairs	224 4 9		
Lamplighters	161 17 8		
Materials used	313 1 5		
Cartages	339 16 4		
Subscriptions to charities	46 4 0		
Miscellaneous	108 15 4		
Interest on debentures	1,337 10 0		
Service laying	1,866 12 2		
Commission and interest	41 12 7		
Bad and doubtful debts	455 7 10		
Wear and tear	1,000 0 0		
Reserved-fund account	1,000 0 0		
Balance	5,117 12 0		
	£29,534 18 11		£29,534 18 11

The Chairman moved the adoption of the report, which he thought was satisfactory, considering the high price of coal, the additional cost of labour consequent on the stokers working on the eight hours system, and the lower price charged for gas. Still, such had been the increase in their business that the usual dividend and bonus could be recommended. He also explained that it had become necessary to extend their capital, and the directors sought power to issue the remaining shares, which would produce £15,000, and to take power to borrow on debentures to one-half that amount, together, £22,500. To show the necessity for taking this course, he stated that 33 miles of pipes had been laid down, and still there were applications for further extensions.

The report and financial statements were adopted.

The retiring auditor was re-elected, and the directors were empowered to raise the additional £22,500 in the way suggested.

The CHAIRMAN announced that the dividend would be payable on and after Monday next.

BAHIA GAS COMPANY, LIMITED.

The Ordinary Half-Yearly General Meeting of this Company was held at the Offices, 10, Coleman Street, London, on Thursday, April 30—CORNELIUS NICHOLSON, Esq., in the chair.

The SECRETARY (Mr. A. J. Head) having read the notice convening the meeting, the following report and accounts were presented:—

The directors submit to the shareholders the usual statement of accounts and balance-sheet, for the half year ending Dec. 31, 1873, by which it will be seen that the profits of the half year, added to the balance brought forward from the previous statement (less loss on exchange), amount to £3906 2s. 9d. This will admit payment of the usual dividend at the rate of 10 per cent. per annum on the preference capital, and 3 per cent. on the ordinary shares, leaving the sum of £406 2s. 9d. to be carried to the next account.

The arbitration with the Provincial Government on the price for lighting the public lamps (alluded to in the last report of the directors) has been concluded, and the full amount claimed by the company was conceded, but the arrears of rental, in accordance with the award, have not yet been paid.

The increase of capital (sanctioned at the extraordinary general meeting of the company in January), by the issue of 7½ per cent. perpetual preference shares, has been effected with complete success, yielding £20,500 for the cancelment of the 10 per cent. redeemable preference shares, and £10,000 additional working capital. Already, nearly £15,000 of the redeemable shares have been cancelled, and the remainder will be paid off, and extinguished, after due notice, under the terms of their creation.

Balance-Sheet, Dec. 31, 1873.

Dr.				*Cr.*			
Capital—				Concession	£7,000	0	0
5000 ordinary shares	£100,000	0	0	Investment	90,468	18	11
1000 10 per cent. pref. ditto	20,000	0	0	Additional during half year	622	6	3
750 ditto redeemable ditto	15,000	0	0	Freehold land	4,705	2	7
250 ditto ditto, Dec., 1870	5,000	0	0	Meters fixed	2,610	0	3
	£140,000	0	0	Office furniture and fixtures	403	12	0
Creditors—				Preliminary expenses	16,914	17	3
On open accounts	2,447	1	5	Due for gas, fittings, &c.—			
On acceptances	10,459	15	2	Public lamps	1,502	18	3
Dividends unpaid	251	18	6	Ditto suspense account	3,586	1	6
Profit and loss	3,906	2	9	Ditto establishments	2,789	2	0
Insurance-fund	39	16	0	Exchange, Brazilian Government	502	15	11
				Private rental and fittings	4,497	1	6
				Sundry accounts	298	1	3
				Stock—			
				Coals	3,308	5	10
				Coke	43	10	9
				Turba	358	13	5
				Fittings	4,973	18	5
				Meters	927	18	5
				Mains, lamp-columns, and other materials	2,175	1	10
				Goods in transit	5,149	5	5
				Bills receivable	3,504	19	6
				Cash—			
				General account at bankers	502	3	6
				Dividend ditto ditto	251	18	6
				In London office	8	0	7
	£157,104	13	10		£157,104	13	10

Revenue Account, for the Six Months ending Dec. 31, 1873.

Coals carbonized	£7,615	9	9	Gas supplied to public lamps	£9,058	19	2
Purifying materials	118	19	7	Less fines	383	1	5
Carbonizing wages	1,128	8	1			£8,675	17	9
Lamplighters wages	807	12	9	Private consumers		4,835	18	1
Yardsmen, labourers, &c.	410	13	10	Public establishments		1,059	14	4
Salaries	1,615	7	9	Meter-rental		448	1	3
Directors fees	400	0	0	Products		1,876	12	4
Auditors ditto	21	0	0	Transfer fees		1	0	0
Rent, taxes, and insurance	328	10	7	Profit on fittings		605	14	9
Interest	298	6	4	Bad debts recovered		33	15	11
Stationery	75	15	7					
Office expenses	45	17	7					
Keep of horses	77	15	7					
Trade charges	243	13	2					
Wear and tear	765	8	11					
Repairs and maintenance of public lamps	373	14	11					
Ditto of mains and services	200	14	8					
Travelling expenses	45	16	8					
Medical attendance	14	5	9					
Law charges	30	10	2					
Bad debts and allowances	126	11	2					
Profit	2,592	1	7					
	£17,536	14	5		£17,536	14	5

Profit and Loss Account, Dec. 31, 1873.

Dividend declared, Oct. 21, 1873	£3,500	0	0	Balance of account to June 30, 1873	£4,926	2	9
Loss on exchange	112	1	7	Revenue account—net profit for this half year	2,592	1	7
Balance	3,906	2	9		£7,518	4	4
	£7,518	4	4	Balance	£3,906	2	9

The CHAIRMAN, in moving the adoption of the report, said he must begin by apologizing for the circumstance that the accounts were not sooner in the hands of the shareholders, owing to the illness of the manager and two of the clerks at Bahia. There were three paragraphs in the report, the first referring to the accounts and balance-sheet, the second to the arbitration with the Government, and the third to the issue of the new capital. With regard to the statements of accounts, he had three observations to make. The adverse item on the debit side of the revenue account was the item of coals carbonized, £7615. This was a very serious matter, and if it stood alone, without any compensation, would be like Jeremiah's figs, very bad indeed; the excess being £2400 over the corresponding period of last year, which was a sum equal to 2½ per cent. upon the ordinary capital of the company. This was a circumstance over which the directors had no control. It arose from two concurrent causes—the extraordinary rise in the price of coal, and the greatly increased charge for freight. But fortunately there was a set-off in the shape of two items on the credit side of the account, both of which were foretold. First, there was the increase in the amount received from private consumers, which was £500 more than at the corresponding period of 1872, and second, the increase in the amount received for products, which was £700 more than at the corresponding period. These two favourable items reduced the excess in the cost of coal to the extent of one-half. And he might say, respecting these items, that the results exactly agreed with what he had ventured to prophesy. On a former occasion he had mentioned that the private consumption was gradually increasing; and with reference to coke, he had expressed an opinion that a population like that of Bahia required to be educated to its use. They were being so educated, and the result was that the returns from this source were £700 more, an increase of no less than 30 per cent. With regard to the arbitration, it was mentioned at the extraordinary general meeting in January, that the questions in dispute between the company and the Government, as to the price to be paid for the public lamps submitted to arbitration, had been decided in favour of the company. But, as it would be seen by the report, the arrears of rental in accordance with the award had not been paid. There was something like £4000 for arrears and interest to be received by the company. But the Government of Bahia was a despotic Government. First the president said he could not pay the money until he obtained the sanction of the Imperial Legislature at Rio. Finding upon inquiry that that was not necessary, he then said that he must obtain the sanction of the Provincial Assembly, and it was for that sanction the settlement was now waiting. There was no doubt the company would get the money, for, as a matter of fact, the Government had recognized the award by making payments under it in respect of the subsequent supply of gas to the public lamps. The third paragraph in the report referred to the issue of the new capital. It would be seen that the directors had succeeded in getting £30,000 of perpetual preference shares taken up, which gave them an additional working capital of £10,000, and would pay off £20,000 of redeemable preference shares. It was his duty, speaking on behalf of the directors, to thank the shareholders who had voluntarily come forward and surrendered £15,000 out of the £20,000—in one case foregoing to the extent of nine months, and in the other to the extent of 21 months no less than 2½ per cent. dividend on their redeemable shares. This operation had put the finances of the company right, and all that was now required was so to invest the money so that it would fructify. The way this was proposed to be done was, in the first place, to erect a jetty, which would save something like 6 per cent. of the cost of the coals sent out to Bahia. The directors were now getting plans and estimates for this work. Another was by the erection of a new retort-house. At the present there was not retort power sufficient for their requirements, and no extensions could be made without erecting a new retort-house. It was thus proposed to spend some portion of the £10,000, and he believed it would tend very much to the benefit of the company.

Mr. ERASMUS WILSON seconded the motion for the adoption of the report.

Mr. MAUDE asked whether any portion of the capital was issued at a premium.

The CHAIRMAN said it was not.

Mr. BROTHERS said, having had a great deal of experience in connexion with foreign companies, it struck him that it was not desirable to have the accounts made up half yearly. The cost and trouble of taking stock twice in a year was quite unnecessary, and he should be happy at the proper time to move a resolution to the effect that the financial statement be in future rendered annually.

The CHAIRMAN said the remarks of the last speaker entirely accorded with the views entertained by the board.

The motion for the adoption of the report was then put and carried, and, on a further motion by the CHAIRMAN, it was resolved that a dividend at the rate of 10 per cent. on the preference, and 3 per cent. on the ordinary shares, less income-tax, be declared.

The CHAIRMAN again referred to the question of half-yearly statements of account, and said they were not required by the Articles of Association. The provision made by clause 95 was that an annual statement should be made to the shareholders at their meeting in the month of October; and in clause 87 it was provided that the directors might, at the ordinary meeting in April, if they so thought fit, and the apparent accruing profits warranted it, recommend the payment of an interim dividend. On the present occasion it did so happen that, from the causes already referred to, the directors were so driven that they had absolutely drafted a report, without a balance-sheet. It would be a great convenience to the staff, and a saving of expense to the company, if the shareholders agreed with them in the suggestion that in future the accounts should be presented only once a year. At the April meeting, in such case, the directors, having had monthly returns made to them from Bahia, would be still in a position to recommend an interim dividend; and the shareholders might rely on it, they would never make such a recommendation unless they were fully satisfied that the profits justified it.

Mr. BROTHERS moved—"That the statement of accounts and balance-sheet usually presented in April be dispensed with in future, and that one yearly account be presented, in accordance with the Articles of Association."

Mr. MAUDE seconded the motion, at the same time recommending that such an alteration be made in the Articles of Association as to enable the annual meeting to be held in November instead of October.

Mr. A. J. KING said it appeared to him that the proposition made by Mr. Brothers was rather a retrograde movement. If the proverb held good at home that "short reckonings make long friends," he thought it would be especially applicable as between persons at very wide distances from each other. He remembered to have seen accounts of this company in which sums were written off for defalcations, and it was quite clear to his mind that the facilities for embezzlement would be increased if an interval of twelve months, instead of six months, elapsed between the periods of balancing the books. Other foreign companies, some with a number of stations, like the Imperial Continental, European, and Continental Union, found no difficulty in presenting their accounts half yearly, and all the London and provincial companies did the same.

The CHAIRMAN said he must promptly correct a remark by the honourable proprietor. There had never been a case of embezzlement in this company. There had been errors in valuation of stock, but if these should occur again they could just as easily be corrected at the end of a year as six months. These errors had arisen, not from carelessness in the office, but from the circumstances under which the coal was landed at Bahia. They were taken from the ship in barges, and as soon as the barges got into shallow water they were put into baskets and carried ashore on the heads of men and women. In that way coal had been lost, and deteriorated, so that from time to time there had been deficiencies in the stock. The proposal to render the accounts yearly was suggested as a matter of convenience to the staff at Bahia, and he hoped it would meet the assent of the shareholders.

Mr. H. P. STEPHENSON said Mr. King had referred to the Imperial, Continental, and other foreign companies; but he was in error in supposing that those companies ever issued accounts at all to their shareholders.

The motion was then put and carried, with one dissentient.

On the motion of Mr. BROTHERS, seconded by Mr. OHREN, thanks were voted to the directors, and the chairman having acknowledged the same, the proceedings terminated.

PRESENTATION TO THE MANAGER OF THE LANCASTER GAS-WORKS.—The *employés* at these works were entertained at dinner on Thursday, the 23rd ult., by Mr. Fleming, their esteemed manager, at his residence. After the usual loyal toasts, and the health of the chairman and directors, and the prosperity of the company had been duly honoured, Mr. Hathornthwaite proposed the health of Mr. and Mrs. Fleming, and, in a feeling address, spoke of the very valuable services Mr. Fleming had rendered to the company, also of the kind and courteous manner in which he had treated all the *employés* under him. He took occasion, on their behalf, to present him with a handsome silver salver, bearing the following inscription:—"Presented to William Fleming, Esq., engineer, by the *employés* of the Lancaster Gas Company, on the occasion of his marriage. April 7, 1874." Mr. Fleming, in thanking the company for this expression of their kindness, and for the courteous manner he had been met with by them in carrying out all his arrangements, impressed upon them the necessity of still greater exertions, having a due regard to all that would tend to economize in their different departments. The rest of the evening was spent in a pleasant manner.

METROPOLIS GAS SUPPLY.

Dr. Stevenson's report for the month of April states that the gas supplied in St. Pancras at the testing-station by the Imperial Company had an average illuminating power of 14·4 standard sperm candles; the maximum was 15, and the minimum 13·5 candles. The illuminating power was nearly the same as during the preceding month. Of impurities, ammonia was invariably present in small quantity, and sulphuretted hydrogen was never detected. Sulphur was present to the extent of 23·15 grains per 100 cubic feet.

METROPOLIS WATER SUPPLY.

The following are the returns of the Society of Medical Officers of Health on the composition and quality of the metropolitan waters in April, 1874:—

Names of Water Companies.	Total Solid Matter per Gallon.	Oxygen required by Organic Matter, &c.	Nitrogen.		Hardness.	
			As Nitrates, &c.	As Ammonia.	Before Boiling.	After Boiling.
Thames Water Companies.	Grs.	Grs.	Grs.	Grs.	Degs.	Degs.
Grand Junction	19·23	0·046	0·124	0·002	14·9	3·8
West Middlesex	17·91	0·044	0·129	0·001	14·5	4·0
Southwark and Vauxhall	18·73	0·075	0·123	0·002	14·5	3·9
Chelsea	19·07	0·044	0·115	0·003	14·8	3·8
Lambeth	17·47	0·049	0·116	0·003	14·3	3·8
Other Companies.						
Kent	28·23	0·001	0·239	0·000	21·2	6·0
New River	20·00	0·016	0·136	0·001	15·6	4·0
East London	13·73	0·031	0·165	0·002	15·3	4·2

Note.—The amount of oxygen required to oxidize the organic matter, nitrites, &c., is determined by a standard solution of permanganate of potash acting for three hours; and in the case of the metropolitan waters the quantity of organic matter is about eight times the amount of oxygen required by it.

The water was found to be clear and nearly colourless in all cases but the following, when it was more or less turbid—namely, in those of the Grand Junction, the Chelsea, the Southwark and Vauxhall, and the Lambeth Companies. The average quantity of water supplied daily to the metropolis during the preceding month was, according to the returns of the water companies to the Association of Medical Officers of Health, 109,544,116 gallons; and the number of houses supplied was 508,818. This is at the rate of 32·6 gallons per head of the population daily. The last official return from Paris stated that the average daily supply per head of the population was 28·5 gallons; but this includes the water used for the public fountains, and for the ornamental waters in the Bois de Vincennes and the Bois de Boulogne. Hy. Letheby, M.B.

The Registrar-General publishes the following returns of the average daily quantity of water supplied by the London water companies, during the month of March, 1874. According to their returns, 109,544,116 gallons, or 497,709 cubic mètres of water (equal to about as many *tuns* by measure, *tons* by weight) were supplied daily; or 215·3 gallons (97·8 decalitres), rather less than a *ton* by weight, to each house, and 30·3 gallons (13·8 decalitres) to each person. According to returns of the London water companies made to the select committee on East London Water Bills (session 1867), it is estimated that, during the year 1866, about 82 per cent. of the total supply of water for all purposes was for domestic use. Applying this proportion to the total quantity supplied daily in the month of March, 1874, it may be estimated that about 89,826,175 gallons were used for domestic purposes, or about 24·9 gallons per day for each inhabitant, against 23·7 in the corresponding month of last year. This proportion varies from month to month, but the Registrar-General has no means of giving a more exact estimate.

Companies.	Number of Houses, &c., supplied in Mar., 1873.	Mar., 1874.	Aver. Daily Supply of Water in Gallons* during Mar., 1873.	Mar., 1874.
Total supply	501,745	508,818	102,837,488	109,544,116
From Thames	234,462	238,786	55,236,489	57,489,758
„ Lea and other Sources	267,283	270,032	47,600,999	52,054,358
Thames.				
Chelsea	28,247	28,395	7,772,900	8,066,700
West Middlesex	44,421	45,507	8,686,602	8,715,561
Southwark and Vauxhall	79,152	79,382	17,157,496	18,105,200
Grand Junction	33,500	34,718	10,918,091	10,949,397
Lambeth	49,142	50,584	10,701,400	11,652,900
Lea and other Sources.				
New River	120,891	121,908	21,172,000	24,133,000
East London	104,637	105,562	20,558,000	21,369,000
Kent	41,755	42,562	5,870,999	6,552,358

* Including that for manufactures and for various purposes other than for domestic consumption.

Note.—The return for March, 1874, as compared with that for the corresponding month of 1873, shows an increase of 7073 houses, and of 6,706,628 gallons of water supplied daily.

Dr. Frankland, F.R.S., reports, as the result of the chemical examination of the water supplied to the metropolis during April, that, taking the amount of organic impurity in a given volume of the Kent Company's water as unity, the proportional amount of this impurity in an equal volume of water supplied by each of the other metropolitan water companies during that month was—New River, 1·2; East London, 2·7; West Middlesex and Southwark, 3·4; Grand Junction, 3·7; Lambeth, 3·8; Chelsea, 4·3. The quality of the water delivered by the companies drawing their supply from the Thames, although showing an improvement upon that supplied during March, was "still much polluted by soluble organic matter." As usual, the water drawn from the Lea by the East London and New River Companies was of superior quality, but that supplied by the Kent Company from deep wells was the "only water delivered in a clear and transparent condition." All the river water delivered on the 10th inst. was slightly turbid, and that drawn from the mains of the Southwark and Lambeth Companies "contained abundance of living and moving organisms."

North London Water Supply.—In reference to a paragraph in our last, under this heading, a correspondent, who possesses ample means for ascertaining the facts, sends us the following statement:—"On the morning of April 16, two large mains broke, at the same time and apparently from the same cause—probably an accidental accumulation of air in the mains—the breakage severing the connexions between the pumping-engines and the reservoir. No time was lost in repairing the damage, the company having taken the precaution of keeping duplicate castings in stock. The more difficult, a 39-inch branch pipe, was repaired in 48 hours, the smaller one in 22 hours. The men worked night and day, and during the whole time the supply was kept up by duplicate engines and connexions in mains. Although the pressure was somewhat reduced so as not to reach the cisterns in some of the highest houses, all the districts had a supply, and none was left without water in case of fire."

ASSOCIATION OF MUNICIPAL AND SANITARY ENGINEERS AND SURVEYORS.

A Meeting of the Lancashire and Cheshire District Committee of this Association was held on the 10th of April, in the committee-room of the Town-Hall, Chester, kindly placed at the disposal of the society by his worship the mayor. The object of the committee's visit to Chester was to inspect the main sewerage works, now in course of construction, under the direction of Mr. G. A. Bell, and afterwards to resume the discussion on the papers read at the Liverpool meeting by Mr. G. F. Deacon, of Liverpool, on "Waste of Water," and Mr. A. M. Fowler, of Salford, on "The Utilization of Sewage, and the Water of Polluted Streams." The following members were present:—Mr. R. Vawser, the secretary, Warrington; Messrs. Matthew Jones, Chester; J. Proctor, Bolton; P. Smith, Blackburn; S. Kelsall, Stretford; G. Dickinson, Westleigh and Bedford; J. Wilson, Bacup; A. Jacob, Barrow-in-Furness; W. A. Richardson, Tranmere; G. Watson, Crewe; John D. Simpson, Buxton; James Holland, Witton-cum-Twambrooke; John Jackson, Stockport; Joseph Lobley, Hanley; J. G. Lynde, Manchester; A. M. Fowler, Salford; and R. Hughes, Rhyl.

Mr. Thorburn was called to the chair, and the minutes of the meeting were read and confirmed.

Mr. Vawser read letters of regret from several gentlemen unable to be present, and stated that Mr. Bell, the engineer, would presently escort them over the main sewerage works of the city, and explain to them everything connected therewith. Members would also have the privilege of inspecting the Chester Water-Works.

The Chairman had much pleasure in proposing a vote of thanks to the mayor and corporation for granting them the privilege of meeting in their noble town-hall. Those present who had not been over it would find that it contained many matters of interest. The hall was indeed well worthy of the people of Chester, and the least thing they could now do would be to give the mayor and corporation a hearty vote of thanks for their kindness.

The motion was seconded and carried unanimously.

The Chairman announced that there was an important meeting in London on the 24th of the month, interesting to members, and it was proposed that they should on that occasion examine the sewerage works of the city. He was sure they would find such a visit very interesting. It would be only by this means that they would be able to fully realize the magnitude of works of this kind. These works, he believed, were successful; but he thought they were still capable of further development, and there were plenty of other things that would interest them there, he was sure. The meeting at Birmingham would extend over two days, and the chairman expressed a hope that members would be able to attend it, when they would have an opportunity of seeing the large works now about to be commenced in that town.

The following description of the main outfall sewers now in course of construction in Chester was then read by Mr. Bell, the engineer in charge of the works, after which the members inspected the works in company with Mr. Bell, who explained the nature and object of the works during the tour:—

"Gentlemen,—I beg leave to submit for your information a brief statement of the purposes and character of the sewerage and outfall works which are now in course of construction in this city, and which it is the intention of your association to examine.

"Like the existing practice in many other towns, the sewage of Chester is discharged into the river at many independent outlets, and the internal sewerage is so arranged that the greater part of this sewage enters the upper length of the river above the weir or mill-dam, which is adjacent to the old Dee Bridge. The bottom of this part of the river is not under the influence of scour from tidal action, and, consequently, a considerable deposit of solid matter has taken place in the river in front of each outfall; and this is an evil which would naturally continue to increase. In addition to this, there has also been a constant fouling of the river from the liquid parts of the sewage.

"This was a condition of things which the corporation determined to remedy, and the manifest course to be taken was to construct an intercepting sewer along the right bank of the river, and thereby convey the sewage to some point on Sealand, where it could either be utilized by irrigation or conveyed directly into the tidal part of the river, after undergoing that degree of clarification which would render its discharge unobjectionable.

"The committee of the corporation charged with this work gave long and anxious consideration to that part of the question which regarded the point of outfall. After the suggestion of many different sites at a greater or lesser distance from the city, the present ground was selected and adopted as the one combining great advantages, either for ready and rapid discharge into the river after clarification, or (by an addition of a stand-pipe and main of iron pipe) from which to convey the sewage on such part of Sealand as might be adopted for irrigation.

"Another purpose to be attained was the internal drainage of the north-west part of the borough, which is a rapidly increasing district, in which, in consequence of there being no proper outfall, no lines of sewer had been laid. The provision of sewerage for this district became a growing and a very pressing demand upon the corporation, and the first step towards this end would necessarily be the laying of an intercepting sewer somewhere near the north and west boundary of the borough.

"This was accordingly determined upon; the sewer in course of construction consisting of one for the southern and principal part of the city, and the other for the north-west district—as they are shown upon the accompanying plan and section.

"The southern sewer will be 2½ miles in length. It will be circular in form, and vary in size from a diameter of 4 feet to a diameter of 1 foot 6 inches. The 4 feet and 3 feet 6 inches diameters will be brickwork, in two 4½ inch rings set in hydraulic lime mortar. The 2 feet and 1 foot 6 inches diameter will be stoneware pipes. The line will be carried by inverted syphons under a brook and under the canal basin. Each syphon will consist of two lines of cast-iron pipes of 2 feet in diameter. The pipes have been cast with the joints patented by Mr. William Williams, of Liverpool, which allows of the required curvature being readily obtained, and affords great facility of laying.

"In use and action each of these lines of pipes will be in work together or singly, according to the amount of the flow of sewage. Their combined or single action will be regulated by means of gates within the man-holes which join the brick sewers to the syphons.

"On certain parts of the line, as will be observed by the section, heading is necessary; and at these points, while retaining the same width of the sewer, the internal height will be increased to 4 feet 6 inches.

"The line is also to be carried through Chester Castle, the boundary walls of which are of great thickness; and beyond this point and the bridge gate a heading is required through and under a projecting angle of a very old portion of the city walls.

"On the north-west line of sewer, which is 1 mile in length, the only part of any importance or difficulty is the passage under the Dee and Mersey Canal. The intended direction of the line has here been changed, so as to carry the heading through more solid ground, and clear of the canal embankment.

"The southern sewer will drain an area of 502 acres, and the north-west sewer an area of 232 acres, being a total of 734 acres.

"The minimum flow of sewage will be 1¼ million gallons in 12 hours, and I calculate the maximum flow at about 8 million gallons. We provide storm water overflows along the lines of sewer to meet the emergency of very heavy rainfall.

"At the outfall works one set of tanks will receive the sewage, and dis-

charge by gravitation so long as the level of the tidal water in the river will permit.

"Another set of tanks built above the level of the ground will receive the sewage by pumping; the lift being 12 feet, and the pumping machinery to be provided being two 10-horse power horizontal engines, and four of Gwynne's centrifugal pumps.

"It is intended to work these tanks by continuous flow, and to precipitate and deal with the mud according to the system of General Scott, by which I anticipate that the whole operation will proceed without causing any public offence or annoyance, and the river will be kept entirely clear of the passage into it of any of the solid constituents of the sewage."

On returning to the town-hall, Mr. Bell volunteered to give any further information the members might require, and stated that the sewage in the tanks would have a steady and continuous flow, and that it was expected the solid matter would precipitate at about 1 inch per minute, and the effluent water flow off perfectly clear; the working expenses are estimated at £600 per annum.

After some further conversation,

Mr. LYNDE proposed a vote of thanks to Mr. Bell for his paper, and for conducting them over the works and answering the questions which had been put to him.

Mr. BELL, in acknowledging the vote of thanks, said how much honoured he felt by their coming to see the works, and how glad he was to see them.

In the absence of Mr. Deacon, it was determined not to discuss his paper on "Waste of Water."

Mr. FOWLER then read the greater part of the paper prepared for the Liverpool meeting, the substance of which is as follows:—In commencing, he complained that, notwithstanding labours of royal commissioners and select committees, the purification of polluted water is still a disputed question. The first royal commission recommended irrigation as the best, if not the only, method of purification; and the last commission adopted a standard of purity which, in practice, is impossible. The evil is now so great that no improvement is possible without direct action on the part of the Legislature; the adoption of a standard of purity, such as that included in the late Public Health Bill, could not fail to do harm, as the first effect of its adoption would be to drive all trade from the country. Mr. Fowler then stated that, to purify the sewage of Manchester and Salford by irrigation, 15,000 acres of land would be necessary; and Leeds would alone require more than 6000 acres, besides 20 miles of outfall sewer, costing £210,000, before suitable land could be reached. He then reviewed the results obtained by Messrs. Wrigley's paper-works, where the waste water was purified by being mixed with lime and precipitated, and then filtered through sand, the effluent water being superior to the water supplied by the Thames companies to the inhabitants of London. He therefore advocated this system for the purification of sewage, which would render the water quite fit to be turned into a stream, or to be re-used as a second supply in manufacturing towns, thereby rendering the pure water (now used by fellmongers and other trades requiring large quantities of water) available for domestic purposes, the purified sewage being supplied for manufacturing purposes only. He entered into calculations to show that this might be accomplished easily, the cost of cleansing and delivering the effluent being less than now paid for trade purposes. Mr. Fowler acknowledged that ultimately more stringent rules with respect to the discharge of polluted water might be adopted, but the standard adopted by the Government was impracticable at present.

A general discussion then ensued, after which,

The CHAIRMAN said the idea was a novel one, and there might be cases where such a process might become a source for supplying water for a specific purpose. They knew that the population of this country was growing at a rapid rate, and it would soon become a serious question where water was to come from to supply the towns. He thought the day might arrive when such a process might provide the additional supply necessary in large manufacturing towns for trade and sanitary purposes. Until that day arrived they could hardly expect that the experiment would be tried.

A vote of thanks to the chairman terminated the proceedings.

The next meeting of the committee will be held at Barrow-in-Furness, on Friday, the 7th of August next.

THE NORTHERN COAL TRADE.

(FROM OUR OWN CORRESPONDENT.)

A strong sense of relief was experienced upon Newcastle Quayside, on Saturday week, when it was known that the Durham miners had agreed to the compromise proposed by the masters of a reduction of 10 per cent. upon the wages, and that in neither Durham nor Northumberland was there any possibility of a strike. Business upon the Tyne had been at a stand during the week, as, with the wages question unsettled, no one was disposed to enter upon new transactions. Indeed, merchants in all parts of the country appear to have withheld their orders until they knew how affairs would turn; there were absolutely no orders in the market. The few coasting vessels that were in port were more than equal to the requirements of the trade, and though there was no change in quotations, a very limited amount of tonnage was taken up. The gas coal trade is extremely slack; prices, in consequence, are irregular. The iron trade of the North, however, was a little steadier last week. A few more orders were coming to hand, and it was hoped, by those engaged in the manufacturing coal trade, that affairs had got to their worst, and that the price of iron and manufacturing coals would scarcely go below the present point. Steam coals were in moderate demand. Though the chief collieries make pretence of holding by the quoted rate, 18s. per ton, no such prices are realized for the bulk of the steam coal that is sold in the open market. Generally speaking, the principal collieries have large stocks of all sorts of coals. There is some speculation whether, the wages question having been settled, buyers may not come into the market to make up their stocks. If they do not, most of the collieries in the north will have to continue working upon short time. The chemical trade, which had been extremely dull all the week, improved a little on Friday; but the advance was very slight. As far as possible, makers are keeping the production down. Labour is tolerably abundant in the north-east district of England, and there is an impression that if things keep in the dull condition they are in at present much longer, there will be a general reduction of wages.

SWANSEA GAS COMPANY.—The usual meeting of the shareholders of this company was held on the 17th ult.—Alderman Phillips, the chairman, presiding. A dividend of 10 per cent. was declared upon the original shares, and of 7½ upon the ordinary shares of the company.

AMMONIACAL GAS REFUSE AS A REMEDY FOR INSECTS ON TREES, &C.—M. J. Fries has recently addressed a note to the Academy concerning the efficacy of ammoniacal liquor, obtained during the manufacture of coal gas, for destroying insects that attack plants. He says that, having taken some land in 1852 at Münster, in Alsace, which had been left uncultivated for many years, he found that all his first year's planting was devoured and destroyed by myriads of insects of all kinds. The idea struck him of watering the soil abundantly in autumn with ammoniacal gas liquor, diluted with its own volume of water, but strongly charged with tar. The effect was instantaneous and striking; those insects which had sufficient strength left sprang with a bound out of the ground, but died immediately. In subsequent years the plantations were quite restored, and the fruit trees acquired new vigour, partly because of the destruction of the insects but equally so because of the high manurial qualities of the ammoniacal liquor.—*Comptes Rendus.*

IRON AND COAL TRADES OF SHEFFIELD, SOUTH YORKSHIRE, AND NORTH DERBYSHIRE.

(FROM OUR OWN CORRESPONDENT.)

There is, on the whole, a somewhat better feeling in the iron trade of this district, and that, too, in spite of the many rumours which are freely and persistently circulated as to the probability of several more heavy local failures. It is certain, at any rate, that one or two of the best firms in the locality are rather better employed than they were a few weeks back, and not a few business men are of opinion that the recent fall in prices will not fail to bring about a revival of business in the course of the next month or so. Several of the water and gas companies of the larger towns and cities of the United Kingdom are ordering castings and pipes somewhat more freely, and the two or three principal concerns in this vicinity have managed to secure their share of the most recently issued of these favours. Pipes of ordinary sizes, and cast according to the usually adopted specifications, are to be had at from £8 10s. to £9 per ton. It is a somewhat singular fact that, in a recent competition for irregular castings and hydrants at a town not 100 miles hence, the local makers were beaten, and an order given from their very doors to a metropolitan firm.

On Monday, a meeting of the joint committees for Dronfield, Unstone, and Aston was held at Chesterfield, for the purpose of determining what reply should be given to a letter from the Local Government Board, relative to the water supply of those places, which had previously intimated to the board their desire to form a confederated district. It was suggested that the supply be obtained from the Chesterfield Water Company. The board had asked what would be the cost of the undertaking, quality of the water, &c. After some discussion, it was decided to place the matter in the hands of Mr. Hawksley, C.E., London, who has the scheme under his consideration. Mr. Hawksley is the engineer of the Sheffield Water-Works Company.

On Wednesday a meeting was held at Sheffield, under the provisions of the Municipal Corporations (Borough Funds) Act, 1872, to authorize the corporation to oppose the Wakefield Water-Works Company's application to Parliament. Alderman Fairburn, in moving a resolution to that effect, said they could not allow the Wakefield Company to take what really belonged to Sheffield, and commented on the fact of Mr. Hawksley being engineer for both the Wakefield and Sheffield Companies. The resolution was carried.

Messrs. Guest and Chrimes (Rotherham Brass-Works) have recently introduced a hard gun metal bib-tap to their customers, which being accurately turned and fitted on the internal face, enables the washers to resist the high pressures common to constant supply with much greater efficacy than the ordinary brass tap. The price is, I believe, somewhat more than in the latter case, but there is no doubt of the gun metal tap being of equivalent superiority.

There is no great amount doing in the steam coal trade, either for the home or export trade. The local trade in engine fuel is very quiet, and there are no considerable shipments from Goole, Hull, or Grimsby. The foundries are taking moderate lots only. In most cases prices are easier, and although there is no official drop, quotations here are as low as, or, indeed, lower than in any other district.

GLASGOW WATER SUPPLY.—The Loch Katrine water supplied to Glasgow during April, according to the report of Professor Bischof, was clear, very soft, and, as usual, free from all evidence of previous sewage or animal contamination.

UCKFIELD GAS COMPANY.—At the sixteenth ordinary meeting of this company, held on the 30th ult., the directors reported that the amount received from private consumers for gas supply during the past year amounted to £643 4s. 11½d. This substantial increase was, however, accounted for by the fact that owing to the high price to which coals had risen in the spring of last year, the directors felt it imperative to increase the price of gas at Midsummer last from 6s. 8d. to 7s. 6d. per 1000 feet. The coke and tar account also showed an increase. The expenditure had also been larger during the year, owing to the increased price of coals, and to the necessity for resetting the beds of the retorts. The assets and liabilities account showed a balance of £299 13s. 4½d., against £303 17s. 11d. last year, a comparison to which the directors specially pointed, as showing that the increase in the price of gas made by them at Midsummer last had barely maintained the company in the same financial position it was in twelve months ago—in fact, after paying the same dividend as last year the amount of reserve to carry forward was somewhat less than it was then. This afforded ample proof of the propriety of the rise in the price of gas, and justified that proceeding both to consumers and shareholders. The directors proposed that the usual dividend of 8 per cent. should be paid to the shareholders, which would absorb £140 of the balance, and leave £159 13s. 4½d. to be carried forward. The directors expressed their regret at the loss of one of their number, D. Edwards, Esq., whose death occasioned a vacancy, which had been filled up by the appointment of Mr. William Boniface.

APPOINTMENT OF MEDICAL OFFICER OF HEALTH TO THE CITY OF LONDON.—At the meeting of the Commissioners of Sewers, on Tuesday, the 28th ult., the Sanitary Committee submitted a report on this question, which was ordered to be printed and circulated among the members, and the consideration of the recommendations was adjourned. The report states—"That the committee are of opinion that the duties of the medical officer of health for the City of London to be observed are defined by the provisions of the City of London Sewers Act, 1848 and 1851, and by the various Acts of Parliament having reference to the public health, or for regulating the sanitary condition of the City of London, and should include such other duties as may in any future Act of Parliament, or by any orders or regulations having reference to sanitary matters, by the Commissioners of Sewers for the time being, be made. The committee are of opinion that the medical officer of health should be required to attend at the office in Guildhall daily, from the hours of eleven to twelve o'clock (excepting, of course, Sundays and other holidays), to arrange with the sanitary inspectors their duties for the day, and to receive their reports. The committee, after much consideration, are of opinion that the salary of the medical officer of health of the City of London should be fixed at £500 a year. With regard to the duties of the food analyst, the commissioners consider they are sufficiently defined by the Adulteration of Food Act, and the regulations which the court have made and published in reference to carrying the Act into effect in the City of London. With respect to the salary to be paid to this officer, the committee, considering the great importance that the gentleman who is to fill that office should be of such talent and standing in his profession, that his judgment and opinion may command the deference and respect of all interested therein, cannot recommend a less salary than £200 a year; at the same time the court will remember that all fees receivable from persons applying to have analyses made for them are ordered to be paid to the Chamber of London, to the account of the commissioners. The committee think the food analyst should call from time to time at the office to communicate with the inspectors on their duties, and on questions of analyses that have arisen. The committee also express their opinion that, should a gentleman be appointed by the court to fill both offices, the salary of such officer should then be £600 a year. The committee recommend that the court advertise at once for candidates for the offices, jointly or separately, and fix a day for receiving the same and for the election. The committee also are unanimously of opinion that, in consideration of the long and valuable services of Dr. Letheby as medical officer of the City of London, and of the benefit which he, in that eminent position, has rendered to the cause of sanitary science, the court should accept with pleasure his offer, and appoint him to be honorary consulting medical officer of health for the City of London.

Register of New Patents.

2427.—Silber, A. M., Cheapside, London, "*Improvements in the construction of burners for the combustion of gas.*" Patent dated July 14, 1873.

This invention relates to an improved mode of constructing burners for the combustion of gas in a regulated manner, a steady, uniform, and powerful flame being obtained of greater brilliancy and intensity than has hitherto been produced with a like consumption of gas by means of any known burners, thus making the gas far more available for illuminating and heating purposes than when ordinary burners are used. In some respects, the principle upon which this burner is constructed is similar to that described in patent No. 3325, dated December, 1870.

In the interior of the burner bell-mouthed or other shaped air-feeding passages or air-tubes are employed, which are concentric with the annular gas-supplying chamber. There are also one or more air-feeding passages on the outside of the annular passage, to which the gas flows to the point or points of ignition. Care must be taken that the supply of atmospheric air fed through the internal passages is about equal to that from the exterior. Hence the gas

FIG. 1

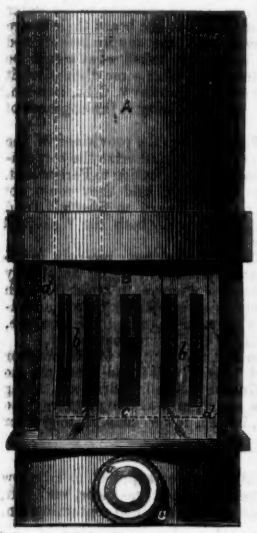


FIG. 2

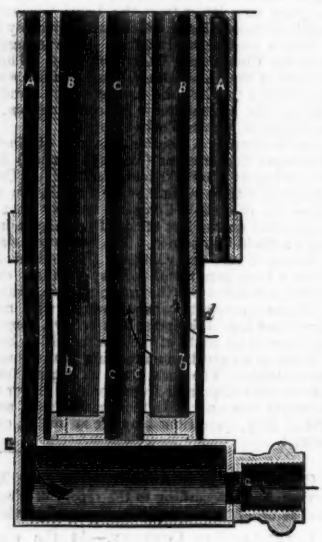


FIG 3

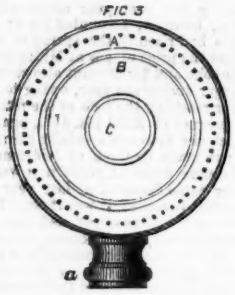


FIG. 6

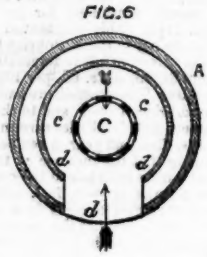


FIG. 4

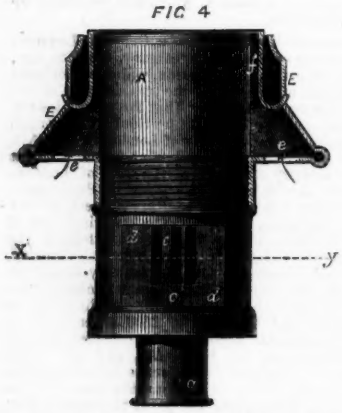
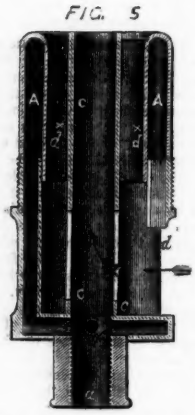


FIG. 5



passes in its own annular pipe or conduit through and between other pipes or conduits containing moving columns, cushions, or currents of air, supplied to the flame both internally and externally, so that a sufficient quantity of oxygen from the atmospheric air is introduced to obtain a regular, intense, and steady flame. It should be observed that the central current of air is fed to the flame at a higher point than the annular current that surrounds it, which is found to be of great importance.

For the purpose of producing a proper condition of combustion, in some cases there is fixed over the upper end of the burner a cap or cone which has a slit or opening at the top for the passage of the gas under ignition. The air thus reaches the flame before or whilst it emerges into the atmosphere, and thus what may be described as a heating chamber is obtained below the point of combustion—that is to say, around or on the sides of the root of the flame.

In order to produce a powerful light or intense heat, two, three, or more concentric annular gas-passages are sometimes combined in the same burner in a manner somewhat similar to the mode in which concentric tubes or wick-holders are combined and disposed in the oil-lamps of lighthouses, the gas-passages being in this case combined with air-feeding passages in the manner described in reference to a single gas-burner. In this case it is found advantageous to make the external air-feeding passage of the same length as the body of the burner.

Fig. 1 is an elevation, fig. 2 a vertical section, fig. 3 a plan of the burner. A is the body of the burner—that is to say, the annular or tubular passage through which the gas flows to be ignited or consumed at the upper end. Gas is supplied to this passage through the pipe *a*. B, C, are air-tubes, fitted internally of and concentric with the gas-passage A. The passages B, C, are slotted at their lower end, as shown at *b*, *c*, for the admission of atmospheric air, which enters through a space *d*, contrived at the lower portion of the gas-passage A.

Fig. 4 is an elevation of a similar arrangement of burner, fig. 5 is a transverse vertical section of the burner, fig. 6 is a horizontal section on the line *x*, *y*, of fig. 4. The gas-passage A has within it a concentric air-tube C, with slots *c* for the admission of atmospheric air, supplied through the space *d*. There is an annular air-space *d** between the air-passage C and the gas-passage A; *e* are apertures in the base of the gallery or chimney-holder E, through which atmospheric air passes up into an annular air-space *f*, between the passage A and the inner side of the chimney holder E, so that the gas and flame emerging therefrom are between two columns, currents, or cushions of atmospheric air. A conical or dome-shaped cap may be fitted at the top of the burner, so that the air-space *f* may form at its upper end a conical annular heating-chamber round the root of the flame.

2524.—Nicholson, R., Dulwich, Surrey, "*Improvements in machinery or apparatus for charging and discharging gas-retorts, and in apparatus connected therewith.*" Provisional protection only obtained. Dated July 24, 1873.

This improved combination of machinery consists of an open travelling frame running upon wheels along rails in front of the retorts. The frame, being cranked downwards at the front and rear ends to allow of the scoop being lowered nearly to the ground, is caused to travel along its rails so as to bring the machine opposite any retort by means of a pinion turned by a winch handle and gearing, into a spur wheel mounted on the axis of one of the running wheels, which may, if desired, be fitted with breaks. The sides of the travelling wheels form rails and racks, along which the framing, carrying a combined scoop and rake, travels towards or from the mouth of the retort, the running and spur wheels being driven by straps, pitch chains, gearing, or otherwise, from the main shaft of the machine, which is fitted with a winch handle at both ends. This shaft carries also chain pulleys for the purpose of driving over-head pulleys, over which other chains are passed for supporting the combined scoop and rake, counterweights being hung to the opposite ends of the suspending chains to balance the weight of the scoop and rake; sliding clutch-boxes are provided on the driving-shaft for throwing the travelling motion of the machine or the raising and lowering motion of the scoop and rake in or out of gear as required, and breaks are applied to the overhead pulleys for the purpose of maintaining the scoop perfectly steady when within the retort. The counterweights are disposed one on each side of the scoop, and centrally to the machine, and are guided by a rod passing along a slot or groove on one side or at both ends thereof. The scoop and rake are disposed in the centre of the machine, and are weighted at the rear or outer end.

The scoop is turned in its suspended bearings by a hand-wheel at the back, so as to discharge its contents into the retort, and the rake spindle which passes longitudinally along the centre of the scoop and through the centre of the hand-wheel, is turned, so as to cause its head, which is situate at the end of and outside the scoop, to cut through the coke by a separate hand-wheel, which has a square boss thereon fitting a corresponding hole in the scoop actuating the hand-wheel, so that when brought together the two may be locked in position, but when separated the rake can be manœvered without moving the scoop.

The above arrangement is applicable to cylindrical retorts, but where D retorts are used the following arrangement is preferred:—In lieu of making the spindle of the rake to rotate, it is caused to act like a long lever on a central fulcrum, and is bent slightly at its forward end, so as to admit of the rake-head, which is attached to it, to lie within the end of the scoop. On elevating the back end of the rake shaft or lever, its forward end, with the rake-head, is depressed, and cuts into the coke.

The scoop is made removable from the machine, when worn out, by fitting it into a socket or holder formed in the part which is mounted in the suspended bearings.

In order to fill the scoop, a travelling tender with inclined bottom is employed, which should contain sufficient coal for nine retorts. This tender runs along one of the first-mentioned guide rails on the retort floor for carrying the open travelling frame, and along an intermediate rail laid between them, and is moved by a pinion and spur-wheel actuated by a winch handle; a barrel or shaft with fitted arms is provided across the mouth of the tender, and is rotated by a hand-wheel outside, in order to expedite the delivery of the coals into the scoop.

2527.—St. John, W. H., New York, U. S. A., "*Improvements in processes for purifying illuminating gas and apparatus therefor.*" Patent dated July 24, 1873.

This invention relates to the purification of illuminating gas produced by distillation from bituminous coal, oils, resin, and similar materials. It is designed to effect purification without the use of any water whatever other than that evolved from the coal or gas producing substance while being distilled; to dispense wholly or for the most part with the necessity of the usual purification by means of lime or oxide of iron, and to secure practically a larger quantity of gas from a given weight of coal than is possible with the gas-making methods and operations heretofore in use.

To secure these results the invention consists in a novel process of purifying the gas by causing it to come in intimate contact in a chamber distinct from the main with the condensed products brought over from the retorts during distillation; this aqueous liquid absorbing the ammonia from the gas, and fixing it by means of the acids held in solution, or absorbed from the gas by the liquid, the tar particles being meanwhile caused to agglomerate in the liquid, so that a perfect purification of the gas is secured without the usual washing or other expensive or deteriorating process or operation.

2534.—Robey, J., Manchester, "*Improvements in treating sewage and other foul liquids for the economical removal and utilization of soluble and suspended impurities contained therein, and in apparatus for the same.*" Patent dated July 25, 1873.

The object of this invention is to treat sewage and other foul waters for the purpose of purifying the same by a combined system of precipitation and filtration. Raw peat, is well macerated with water to a fluid consistency, and mixed with the sewage or other foul liquid. Perchloride of iron or other flocculating or coagulating agent is then added, and the whole run into a tank fitted with upright filtering frames of any convenient shape, made by preference of bamboo or cane, and covered with any filtering material, whereby an enormous area of filtering service is obtained, in proportion to the area of ground covered by the tank. The clear effluent water is then passed through beds of charcoal to remove the soluble impurities.

APPLICATIONS FOR LETTERS PATENT.

1390.—Crawford, A., Glasgow, "Improvements in water-closets, and in waste-preventing water-supply apparatus." April 22, 1874.

1391.—Forbes, Rev. G. H., Broughton, Northampton, "Improvements in the utilization of the foul or refuse lime of gas-works." April 22, 1874.

1398.—Hart, E., Marylebone, Middlesex, "New or improved means or agents for disinfecting and deodorizing purposes." April 22, 1874.
1415.—Lake, W. R., Southampton Buildings, London, "An improved method of and apparatus for the deodorization and utilization of sewage." A communication. May 23, 1874.
1424.—Wilson, M., Brixton, Surrey, "An improved method of and apparatus for supplying oxygen in rooms and other closed places wherein the air is vitiated by the burning of gas or other lights." April 24, 1874.
1438.—Towle, J., Oxford, "Improvements in the means employed for collecting, treating, and distributing sewage." April 24, 1874.
1430.—Thomson, W., Glasgow, "A new or improved tube-expander." April 24, 1874.
1435.—Lowe, C., and Gill, J., Manchester, "Improvements in the manufacture and separation of certain mixed coal-tar products." April 24, 1874.
1490.—Lee, J. W., Cambridge, "Improvements in the manufacture and working of direct-acting pumps." April 29, 1874.
1509.—Bond, Dr. F. T., Gloucester, "Improvements in filtering and purifying water and other liquids." April 30, 1874.
1510.—Bond, Dr. F. T., Gloucester, "The preparation of improved materials for disinfecting and deodorizing purposes." April 30, 1874.

GRANTS OF PROVISIONAL PROTECTION.

1069.—Beauregard, F. A. T. de, Paris, "Improvement in the packing of pipe-joints." March 27, 1874.
1175.—Pearson, E., Old Kent Road, Surrey, "Improvements in water-closets and in taps for the same." April 4, 1874.
1243.—Lake, W. R., Southampton Buildings, London, "Improvements in water-meters." A communication. April 10, 1874.
1256.—Suffield, T., Bermondsey, Surrey, "Improvements in pumps, chiefly intended for corrosive liquids." April 11, 1874.
1260.—Moule, Rev. H., Fordington, Dorset, "Improvements in the production and manufacture of gas." April 11, 1874.
1269.—Auerbach, G., and Gessert, T., Elberfeld, Germany, "Improvements in manufacturing alizarin and isopurpurin out of antracene." April 13, 1874.
1279.—Porri, J., and Leigh, E., Blackrod, near Chorley, Lancs, "Improvements in apparatus used in the manufacture of gas." April 14, 1874.
1286.—Lake, W. R., Southampton Buildings, London, "Improvements in double-acting lift and force pumps." A communication. April 14, 1874.
1288.—Muir, J. S., Leeds, "Improvements in the manufacture of gas." April 14, 1874.
1289.—Muir, J. S., Leeds, "Improvements in the manufacture of petroleum oils and spirits and like hydrocarbons for the manufacture of gas therefrom." April 14, 1874.
1308.—Gottheil, R., Berlin, "Improvements in apparatuses for measuring the supply of water passing through pipes." A communication. April 16, 1874.
1321.—Radford, J., Bradford, Yorks, "Improvements in cocks or taps." April 16, 1874.
1332.—Johnston, W., Lima, Peru, "Improvements in machinery or apparatus for compressing air or gases, or for forcing water." April 17, 1874.
1336.—Thompson, N., Brooklyn, U.S.A., "Improvements in means for connecting together pipes or tubes, and for connecting cocks, tubes, or pipes to other articles." April 17, 1874.
1338.—Waschope, A., Niddrie, Edinburgh, and Cowan, J., Sandymount, Dublin, "Improvements in the manufacture of gas." April 17, 1874.
1360.—Johnson, R., Bradford, Yorks, "Improvements in machinery for exhausting and propelling air, gas, and other fluids and liquids." April 20, 1874.
1391.—Forbes, Rev. G. H., Broughton, Northampton, "Improvements in the utilization of the foul or refuse lime of gas-works." April 22, 1874.
1415.—Lake, W. R., Southampton Buildings, London, "An improved method of and apparatus for the deodorization and utilization of sewage." A communication. April 23, 1874.

NOTICES TO PROCEED.

4130.—Phillips, J., Hammersmith, Middlesex, "Improvements in pipe-joints." Dec. 16, 1873.
4180.—Forbes, Rev. G. H., Broughton, Northampton, "Improvements in the manufacture of gas and quicklime." Dec. 18, 1873.
4192.—Strode, W. W., Mackenzie, J., and Williams, E. P., Regent's Park, Middlesex, "Improvements in gas-stoves." A communication. Dec. 20, 1873.
25.—Gottheil, R., Berlin, "Improvements in motors to be worked by gas." A communication. Jan. 2, 1874.
322.—Clark, A. M., Chancery Lane, London, "An improved process for eliminating the soluble principles contained in gases and vapours." A communication. Jan. 24, 1874.

PATENTS WHICH HAVE PASSED THE GREAT SEAL.

3526.—Harrison, C. W., High Holborn, London, "Improvements in the manufacture of gas, and in the apparatus employed therein." Oct. 30, 1873.
3607.—Soul, M. A., Leadenhall Street, London, "Improvements in self-lighting gas apparatus." A communication. Nov. 6, 1873.
3679.—Sutcliffe, H., and Sutcliffe, W., Halifax, "A new and improved safety syphon-valve tap and connexions for the same." Nov. 12, 1873.
3697.—Benson, M., Southampton Buildings, London, "Improvements in the method of manufacturing gases for illuminating and heating purposes, and in the apparatus employed therefor." A communication. Nov. 13, 1873.

The GRAND MEDAL of MERIT at the VIENNA EXHIBITION has been AWARDED to

GWYNNE & BEALE'S PATENT IMPROVED GAS-EXHAUSTERS,

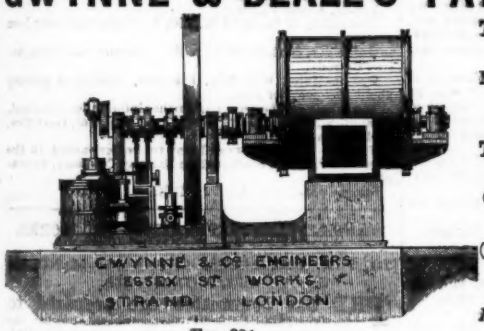


FIG. 224.

The BEST EXHAUSTERS IN THE WORLD.

Made under the personal superintendence of

Mr. BEALE,

The oldest Maker, Inventor and Patentee of

GAS-EXHAUSTING MACHINERY.

(It is NOT CORRECT to state that Mr. BEALE has RETIRED.)

Prices and every information on application.

FIG. 225.

Fig. 224 represents one of those erected at the Imperial Gas-Works, Bromley, capable of passing 210,000 cubic feet of gas per hour. Several others of the same size are now on order for the same Company. These Patent Machines combine the highest quality of workmanship and materials, the largest bearings and wearing surfaces, with the **most perfect system of action yet discovered.** Fig. 225 represents one of a series of four at the Nottingham Gas-Works, each passing 52,500 cubic feet per hour. Gwynne and Co. *do not pretend to enter into a struggle with other makers in respect to cheapness. They have never sought to make price the chief consideration, but to produce Machinery of the very highest quality, and the most approved design and arrangement.* Their prices have been estimated with a due regard to the **excellence of the article produced,** and when this is taken into consideration, they have no fear for the result. The orders executed this season for Exhausters and alterations to their patented system amount to over 4,000,000 cubic feet of gas passed per hour, and to over 300 horse power for Engines to drive them. In every instance their work is giving the greatest satisfaction. Numerous testimonials and references can be given.

REGULATORS, BYE-PASSES, STOP-VALVES, GAS-VALVES, & MACHINERY FOR GAS MANUFACTURE, OF ALL SIZES,

CAN BE HAD ON APPLICATION TO

GWYNNE & CO., HYDRAULIC & GAS ENGINEERS, ESSEX STREET WORKS, STRAND, LONDON, W.C.

G. & Co. are now manufacturing for a London Gas Company three of their 210,000 cubic feet Patent Gas Exhausters, and many of all sizes.

Now ready, Second Edition, price 7s., by post 7s. 3d.,

THE

GAS MANAGER'S HANDBOOK.

By THOMAS NEWBIGGING, A.I.C.E.

The scope of this work is apparent from its title. The First Edition, published a year or two ago was eagerly sought for, and has been now for some time out of print. The favourable reception accorded to it sufficiently proved that it supplied a generally acknowledged want in the profession. The New Edition is published in fcap. 8vo., morocco, gilt. The work has undergone careful revision; much new matter has been added; and its form altered to suit alike the pocket and the desk. Every effort has been made by the Editor to increase its usefulness and render it worthy of the position it aspires to fill—that of an indispensable companion for all persons engaged in gas making.

Orders to be sent to the Publisher,

WILLIAM B. KING,

11, BOLT COURT, FLEET STREET, LONDON, E.C.

VINCENT'S

PATENT IMPROVEMENTS IN

Apparatus for Manufacturing Gas.

Particulars to be obtained by application to—

Mr. LAYARD JONES, Engineer,

25, OLD BROAD STREET, LONDON, E.C.

ADVANTAGES OF GAS FOR COOKING AND HEATING,

BY

MAGNUS OHREN, A.I.C.E., F.C.S.

For Companies to issue to their gas consumers.

Specimen Copy by post 4d., direct from Magnus Ohren, Gas-Works Lower Sydenham, London, S.E.

WANTED, a young man as Gas-Fitter.

Apply, giving references, and stating wages required, to the Brecon Gas Company, Brecon.

WANTED, a thoroughly practical Gas-HOLDER MAKER, to take the entire charge of the manufacture and erection of gasholders.

Apply, by letter, stating past experience and terms, to Edward Finch and Co., Bridge Works, Chepstow.

TO GAS COMPANIES.

WANTED, to Lease a Gas-Work, where the make is not less than 3,000,000 feet per annum.

Address Robert Dempster, Engineer, Elland, near Halifax, Yorkshire.

WANTED to purchase, 5000 to 10,000 tons of GAS COKE. Waggons can be sent to any station for any proportion of above.

Address G. J. Eveson, Gas Coal and Coke Merchant, Stourbridge.

ROBUS, SIMPSON, & ROBUS,

(Late of the Crystal Palace District Gas-Works, Sydenham, and the New City Gas-Works, Montreal, Canada,)

GENERAL CONTRACTORS & RETORT-SETTERS, FITTERS & MAIN-LAYERS.

RETORTS SET on the LATEST IMPROVED PLAN.

Retort-Setters sent to all parts of Europe and America.

Address, J. and H. ROBUS,

BELL GREEN, CATFORD, KENT

TO GAS COMPANIES.

WANTED, by the Advertiser (a thorough competent gas-fitter), a situation as Meter-Fixer, Examiner, Index Taker, or any like capacity. Seven years character from a London Gas Company.
Address F., 74, Larkhall Lane, CLAPHAM, S.W.

EXETER GASLIGHT AND COKE COMPANY.

WANTED, an experienced steady young man as METER INSPECTOR.
Applications, stating age, salary expected, and references, to be sent to MR. W. A. PADFIELD, Gas Offices, Exe Island, EXETER.

WANTED, by an active and persevering young man, of good experience and unexceptionable references, an appointment as CLERK, or in any position of trust.
Address W. N. P., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a situation as Manager or FOREMAN of a Gas-Work. Has had 25 years experience. Disengaged on account of the Corporation purchasing and supplying gas from their former works. First-class references can be given. No objection to go abroad.
Address W. COWELL, Gas-Works, Mold Green, HUDDERSFIELD.

WANTED, by a Gentleman, aged 27, a situation as MANAGER, on the Continent or abroad. Advertiser has been four years in present situation, where the make is above 90,000,000 feet per annum. Understands the manufacture and distribution of gas in all its branches. Speaks French and Italian. Leaving present situation on account of salary being insufficient.
Address SCIENCE, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, an engagement as Manager or MANAGER and SECRETARY of a medium sized Gas-Work. Thoroughly understands the manufacture and distribution of gas, having had many years experience, and can give most excellent testimonials as to character and ability.
Address MANAGER, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

INSPECTOR OF MAINS AND SERVICES.

WANTED, in a large provincial Gas Company, a person to act in the above capacity. He must have a thorough knowledge of main and service laying, meter inspection, &c., and be accustomed to the supervision of men. Salary not less than £2 per week.
Address, stating age, present employment, and enclosing copies of testimonials, H. B., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by the Advertiser, aged 29, an engagement as MANAGER or ASSISTANT MANAGER on a large works. Has had 13 years experience in erecting and managing Gas-Works. Understands perfectly the manufacture and distribution of gas, setting and working of clay and iron retorts, main and service laying, apparatus fitting, or anything in connexion with Gas-Works. Can furnish first-class testimonials as to ability, &c.
Address C. E. P., care of Mr. Porteous, Stromness, ORKNEY.

THE Advertiser desires an engagement as ASSISTANT ENGINEER or SUPERINTENDENT of a Gas-Work, metropolitan or provincial. Well acquainted with the working. Has held the same position before. Can analyse gas and use the photometer. A fair draughtsman, and can produce drawings and good references.
Address E. A., 18, Cawley Road, South Hackney, LONDON, E.

FOR SALE—Gas-Works in Hampshire, with possession on the 30th day of June, 1874.
For particulars, apply to Mr. ALFRED LASS, 60, Cornhill, LONDON, E.C.

SLIDE-VALVES.

FOR SALE—14 12-in. and 5 10-in. Slide- VALVES with outside racks. They have been thoroughly re-fitted, and are equal to new. A low price will be accepted to effect a clearance.
Apply to JAMES WATSON, Engineer and Manager, Crystal Palace District Gas Company, LOWER SYDENHAM, S.E.

FOR SALE, at a reduced price, separately or together, 14 Cast-Iron Retorts, 4 Cast-Iron Hydraulic Mains, several large Wrought-Iron Tanks, 7 Morton's Patent Retort-Lids with Mouthpieces, and sundry other useful ironwork for gas apparatus.
Apply to W. H. BECK, 139, CANNON STREET, E.C.

FOR SALE—Two cast-iron Circular Scrubbers, 6 ft. diameter 12 ft. high, made in plates. The two scrubbers may be put together in one length.
Also One Circular Scrubber, 4 ft. 6 in. diameter, 14 ft. high, in five cylinders. The whole of them with water distributors and gratings complete, and with cleaning doors.
Also several Donkin's Slide-Valves, 9 in. and 12 in., as good as new.
Apply to EDWARD COCKEY AND SONS, FROME.

SURPLUS PLANT FOR SALE.

TWO New Purifier Covers, 5 ft. 2 in. square, 15 in. deep—by Porter and Co., Lincoln.
1 new Rack Valve, 8 in.
1 Rack Valve, 6 in. 1 Screw Valve, 6 in. Both three years in use.
1 Cast-Iron Cistern, 12 by 12 by 15, with 3-in. sockets.
1 Cast-Iron Cistern, 18 by 18 by 18, with 2-in. sockets.
2 Cast-Iron Cisterns, 12 by 12 by 15, with 2-in. sockets.
1 Connexion for Scrubber, with Flange, 17 in.
2 Tees, 6 in. by 5 in., flange and socket; 1 Tee, 6 in. by 6 in.; 1 Tee, 7 in. by 5 in.; 1 Tee, 7 in. by 2 in.
5 Bends, 6 in.; 1 Flange Bend, 6 in.; 3 Bends, 5 in.; 2 Bends, 4 in.; 1 Syphon complete, 5 in.; 2 Syphons complete 2 in.; 2 Double Sockets, 6 in.; 2 Double Sockets, 7 in.; 1 Double Socket, 9 in.
8 Wrought Tramway Rails, 12 ft. each.
Apply to Mr. T. H. BOUTFELL, Manager, Gas-Works, SLEAFORD.

FOR SALE, and ready for immediate delivery by the Barnstaple Gas Company, about 35 ft. of 12-in. Hydraulic Main, in five lengths; 15 ft. of 16-in. Hydraulic Main; cast-iron Stools for ditto; 21 15-in. Mouthpieces; a number of Ascension-Pipes, Bridges, and Dips; together with a quantity of odd castings suitable for a small work.
Feb. 26, 1874.

GRANTHAM GAS-WORKS.

THE Directors require the services of a MANAGER for their works. He must be thoroughly conversant with the manufacture and distribution of gas, setting retorts, main and service laying, and the general routine of a Gas-Work. He will be required to devote the whole of his time to the duties of his office.
Applications, enclosing testimonials and references as to character and capability, and stating age of applicant, and where at present employed, addressed to the CHAIRMAN, must be sent to this Office, on or before the 19th day of May next. Salary £200, with house and large garden; also coal and gas found.

THE Directors of the Clayton, Allerton, and Thornton Gas Company are prepared to receive TENDERS for the erection of Four Beds of Through RETORTS, six retorts in a bed, labour only, the Company finding all material.
Plans and specifications may be seen on application at the Office of the Company.
Tenders, addressed to the Chairman, endorsed "Tender for Retort Settings," to be sent in on or before Monday, the 18th day of May, 1874.
The Directors do not bind themselves to accept the lowest or any tender. By order,
JOHN NIVEN, Engineer and Manager.
Clayton, near Bradford, May 1, 1874.

TO COKE MERCHANTS AND OTHERS.

THE Directors of the Northampton Gas- light Company are prepared to receive TENDERS for the surplus COKE produced at their works for Twelve months, from the 1st of July, 1874, at per ton, weighed on the Company's machine.
The terms of the contract may be seen at the Office of the Company, in Mill Lane, Northampton.
Tenders to be delivered at the Company's Office, on or before the 26th day of May next, addressed to the Manager.
The Directors do not pledge themselves to accept the highest or any tender, and will require satisfactory sureties.
WILLIAM DENNIS, Secretary.
Northampton, April 23, 1874.

THE Directors of the Clayton, Allerton, and Thornton Gas Company are prepared to receive TENDERS of price per cwt. for the supply of Castings, &c., 48 Mouthpieces, oval shaped, also Ascension-Pipes, H-Pipes, Dip-Pipe, Retort-Lids, Furnace Frames and Doors, &c. Also tender for fixing same.
Plans and specifications may be seen on application at the Office of the Company. The contractor will be expected to take the old metal contained in a number of similar and sundry other castings, which may be seen at the works, the highest price for which must be stated in the tender.
Tenders, addressed to the Chairman, endorsed "Tender for Retort Castings," to be sent in on or before Monday, the 18th day of May, 1874.
The Directors do not bind themselves to accept the lowest or any tender. By order,
JOHN NIVEN, Engineer and Manager.
Clayton, near Bradford, May 1, 1874.

THE Oldham Corporation Gas and Water Works Committee is prepared to SELL BY TENDER the following GAS PLANT, or any portion thereof:—
One 7-in. Gas Station-Meter, in circular case, with hydraulic-valves, bye-pass, clock, and pressure-gauge complete.
One wrought-iron Hydraulic Main, 35 ft. long, and 18 in. diameter, with 12 cast-iron branches rivetted on.
One wrought-iron Scrubber, 11 ft. 9 in. by 6 ft., with grids, man-hole, and cover complete.
One wrought-iron Scrubber, 18 ft. 6 in. by 5 ft. 9 in., with grids, man-hole, and cover complete.
One wrought-iron Scrubber, 18 ft. 6 in. by 6 ft. 4 in., with grids, man-hole, and cover complete.
Six 12-in. cast-iron Hydraulic Valves or Traps, with covers and fastenings complete.
One Water Condenser, consisting of one cast-iron cistern, 21 ft. 3 in. by 10 ft. 6 in. by 2 ft. 7 in., with five rows of 12-in. cast-iron pipes, partitions, and covers complete.
A quantity of 12-in. cast-iron Connexion-Pipes
Further information may be obtained on application at the Gas and Water Works Offices, Oldham.
Tenders (endorsed), stating the price for each article separately, will be received up to Tuesday, May 12, 1874.
By Order,
H. BOOTH, Town Clerk.

IMPERIAL CONTINENTAL GAS ASSOCIATION.
(INCORPORATED BY ACT OF PARLIAMENT.)
NOTICE is hereby given that the HALF-YEARLY ORDINARY MEETING of the Proprietors of the Imperial Continental Gas Association will be held at the City Terminus Hotel, Cannon Street, London, on TUESDAY, the 26th inst., at Two o'clock in the afternoon precisely, when a Report will be made to the Proprietors, a Dividend declared for the half year ended the 31st of December, 1873, and the usual ordinary business of such a meeting transacted.
Notice is hereby also given that the Transfer Books of the Association, and the Register of Shareholders, will be closed on Tuesday, the 12th inst., and will remain closed until after the Half-Yearly Ordinary Meeting on the 26th inst.—By order of the Board of Direction,
ALBERT F. JACKSON, Secretary.
No. 30, Clement's Lane, Lombard Street,
London, May 4, 1874.

TO COALOWNERS.

THE Directors of The Gaslight and Coke Company are prepared to receive TENDERS for a supply of COALS, in accordance with a specification to be obtained at this Office.
The principal works of the Company are accessible by railway, in direct communication with all the inland coalfields, as well as by screw colliers from the Northern coalfields.
Tenders to be sent in to me on or before Tuesday, the 26th day of May next. By order,
JOHN ORWELL PHILLIPS, Secretary.
Chief Office, Horseferry Road, Westminster, S.W.,
April 25, 1874.

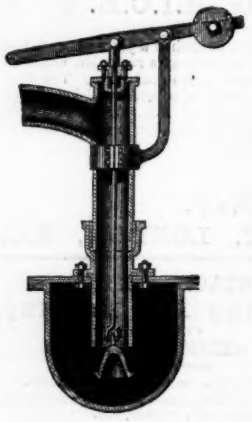
GAS PLANT FOR SALE.

THE North Staffordshire Railway Com- pany offer the following GAS PLANT FOR SALE, viz.:—
15 15-in. Circular Mouthpieces, Lids and Crossbars.
15 6-in. by 3-in. Taper Ascension-Pipes and Bridge-Pipes.
3 Lengths of Hydraulic Main, 14-in. D shape, 7 ft. 6 in. long each.
6 Furnace Doors.
Set of 6-in. Pipe Condensers, with bottom box, eight pipes 21 ft. high.
Square washer.
2 Purifiers, 8 ft. 6 in. by 6 ft. 6 in. by 4 ft. deep, with wrought-iron lids.
2 Wrought-Iron Purifiers, 4 ft. 6 in. by 4 ft. 6 in. by 4 ft. deep, with wrought-iron lids.
12 6-in. Screw Valves.
Gasholder, 30 ft. by 16 ft., with 9 columns and cast-iron girders.
Gasholder, 30 ft. by 16 ft., with 3 columns and wrought-iron tie-rods.
Station-Meter, with 6-in. bye-pass, capable of passing about 3000 feet per hour.
The whole can be seen, and further information obtained, on application to M. JOHN MCMILLAN, Engineer, Gas Office, Stoke-upon-Trent.
Tenders for the above Plant to be forwarded to the SECRETARY, North Staffordshire Railway Company, STOKE-UPON-TRENT.
Stoke-upon-Trent, April 11, 1874.

MANCHESTER (CORPORATION) GAS-WORKS.

TO TAR DISTILLERS, CHEMICAL MANUFACTURERS, AND OTHERS.

THE Gas Committee are prepared to receive TENDERS for the purchase of either the whole or portions of the GAS TAR and AMMONIACAL LIQUOR that may be produced at their Gas-Works, situate at Gaythorn and Gould Street, Rochdale Road, respectively, for the term of One or more years, as may be agreed upon, to commence from the expiration of the periods of the existing contracts. The period of the existing contract for Gas Tar will terminate on the 28th day of February, 1875, and for the Ammoniacal Liquor on the 31st day of December, 1875. Sealed tenders, addressed to the Chairman of the Gas Committee, Albert Chambers, Albert Square, and endorsed "Tender for Gas Tar," or "Tender for Ammoniacal Liquor," as the case may be, must be delivered at this Office on or before Thursday, the 14th day of May next.
The Committee do not bind themselves to accept the highest or any tender.
Forms of tender and further particulars as to quantities and conditions of contract may be obtained on application to Mr. Thomas Peacock, at this Office, on and after Tuesday, the 21st of April instant. By order,
JOSEPH HERON, Town-Clerk.
Gas Office, Albert Chambers, Albert Square,
April 17, 1874.

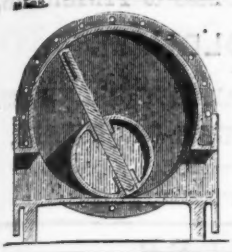


BOX'S
PATENT ANTI-DIP VALVE

Affords a clear gas way through the dip-pipe while the retort is in action, and produces a perfect seal at pleasure, or whenever the retort is open, offering great security against the drawing of air, and obviating the necessity for using any liquid in the now so-called hydraulic main. It is easy of application to existing apparatus, and is comparatively inexpensive. Is not likely to get out of order, as the tar, which will adhere to the bottom of the dip-pipe and the flange of the cone, both of which are faced, will act as a lubricant, and prevent undue wear and tear. The whole, as will be seen on inspecting the accompanying illustration, is exceedingly simple, and every part accessible. To adapt it to the present dips, all that is necessary is to face the bottom edge of the dip-pipe, and suspend a cone by a rod, which passes through the bonnet, the raising and lowering of the cone being performed through the intervention of a weighted lever.
The Patentee is prepared to supply the Patented Apparatus upon the most moderate terms, and will be happy to reply to any inquiries that may be addressed as under—

W. BOX,
GAS-WORKS, CRAYFORD, KENT.

J. BEALE'S PATENT GAS EXHAUSTER.



BEALE'S CONTINUOUSLY ACTING

GAS EXHAUSTERS

ARE NOW MANUFACTURED BY

B. DONKIN & CO.

MR. J. BEALE, of East Greenwich, having retired from business, has made an arrangement with B. DONKIN & CO. for the sole manufacture of his Patent Solid-Slide Gas Exhausters.

B. D. & Co. also make Steam-Engines to drive Gas Exhausters direct or otherwise, and Gas-Valves.

Estimates and Prices on application to

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ENGINEERS & IRONFOUNDERS,

BERMONDSEY, LONDON, S.E.

THOMAS PROUD,

BROOKFIELD WORKS,

103, ICKNIELD STREET EAST, BIRMINGHAM,

MANUFACTURER OF

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ALSO MANUFACTURES AND SUPPLIES EVERY DESCRIPTION OF

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GAS AND WATER WORKS,

INCLUDING

Steel Charging Scoops.
Steel Shovels.
Steel Coke Forks and Screens.
Stokers Iron Barrows.
Wrought-Iron Purifier Covers
Cross Bars, Screws, &c., &c.

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GAS ENGINEER AND CONTRACTOR,

ROSE MOUNT IRON-WORKS,

ELLAND, near HALIFAX,

MANUFACTURES AND EFFECTS

GAS APPARATUS & MACHINERY

OF EVERY DESCRIPTION.

GAS EXHAUSTERS,

WITH STEAM-ENGINES COMBINED.

DRY, CENTRE, AND BYE-PASS VALVES; WROUGHT-IRON AND CAST-IRON SCRUBBERS; ANNULAR AND PIPE CONDENSERS, ALL SIZES.

PURIFIERS from 4 to 40 FEET SQUARE.

Steam-Engines and Steam-Pumps.

RETORT SETTERS & FITTERS SENT TO ALL PARTS.

ALL WORK AND MATERIALS GUARANTEED OF THE BEST DESCRIPTION.

Mr. ALFRED LASS,

60, CORNHILL, LONDON, E.C.,

Is prepared to open the Books, and, if necessary, keep the Accounts of Gas and Water Companies.

To examine the Books and Accounts, and prepare Balance-Sheets for the information of Directors.

To assist Secretaries in preparing Balance-Sheets, according to the "Gas-Works Clauses Act, 1871;" or may be consulted with respect to Accounts generally.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.

Patents procured for Foreign Countries.

Information as to cost, &c., supplied gratuitously upon application to the Advertiser, 42, Parliament Street, WESTMINSTER.

PATENT FUEL AND LIME FOR PURIFYING FROM FOUL LIME.

By a simple process the Foul Lime is converted into Fuel, by the combustion of which the lime is reproduced as a purifying agent.

Licences to work the invention will be granted to Gas Companies on very reasonable terms.

For further particulars apply to Mr. E. MADDOCKS, Manager of the Gas-Works, KETTERING.

The adoption of the above invention, without a licence from the Patentee, will be an infringement of the patent, and will subject the person or company guilty of such infringement to legal process.

HOW TO MAKE MONEY by PATENTS.

BY CHARLES BARLOW.

Third Edition, Enlarged, 142 pages, 8vo., Illustrated Cover.

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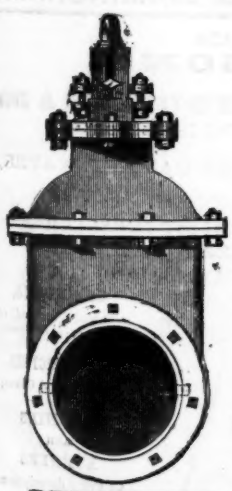
BAILEY'S Patented Inventions are now in extensive use wherever steam is known. Bailey's Patent Steam Gauges, Pyrometers, Water Gauge Cocks, Test Pumps, Fusible Plugs, Steam and Water Valves, Safety Valves, Junction Valves, Pumps, Tell-Tales, Recorders, Lightning Conductors, Electric Telegraphs, Turret Clocks, Steam Joint Cement, Lifting Jacks, Boiler Feeders, Lime Catcher and Separator, Injectors and Ejectors, and every description of first-class Brass Work for Engines and Boilers. Gas-Works Managers who have not our large book should send for it.

16th edition, 1000 engravings, 4to., post free 2s. in stamps, weight 10 oz., cost of production £1000,

BAILEY'S Illustrated Inventions, containing details and prices of goods in our five several departments:—(1) Brass Foundry, Steam Gauges, Indicators, Feeders, and Fittings; (2) Engineers Sundries, Small Tools, and Stores; (3) Machine Pump and Fire Engine; (4) Turret Clock, &c.; (5) Electric Telegraph, A B Instruments, Bells, and Apparatus.

J. BAILEY and Co., Albion Works, Salford, LANCASHIRE.

C. & W. WALKERS' DOUBLE-FACED GAS-VALVES.



These solidly constructed double-faced Gas-Valves are superseding the old system of the light, single-faced disc, which is too uncertain and unreliable in large bores.

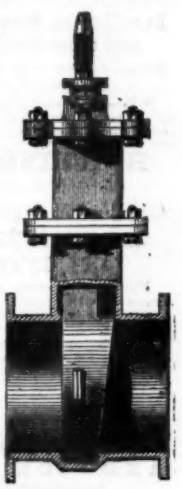
They are guaranteed absolutely gas-tight. They are very massive and rigid, and by improved modes of manufacture they are produced at very little excess in cost over the old light, weak system, which is liable to spring and bend, and become leaky.

The Valve is a rigid wedge of solid cast iron, having two perfectly scraped surfaced facings fitting between the two on the body, which are also surfaced.

A spring in two short halves, and, therefore, not liable to break, is used only for scraping the front facing clean.

The front facing is vertical; the back facing forms the wedge.

At a slight additional expense both flanges are faced to bolt to main-pipes.



GASHOLDERS, TELESCOPE & SINGLE-LIFT, of LARGEST DIMENSIONS.

PURIFIERS, SCRUBBERS, CONDENSERS of most Improved Description.

WOOD SIEVES FOR PURIFIERS,

Which have now been in use for more than ten years, and their advantages and durability fully established. They are made entirely by steam machinery in very large quantities at the most moderate cost.

MIDLAND IRON-WORKS, DONNINGTON, near NEWPORT, SHROPSHIRE; 8, FINSBURY CIRCUS, LONDON.

COST PRICE SHEETS.

MANUFACTURE AND DISTRIBUTION OF GAS. These sheets are the same as were laid before the Dublin Meeting of the British Association of Gas Managers; but in the REPRINT, NOTES have been added for the guidance of those using them. Copies of the two sheets may now be had, price 5s.
South Shields. W. J. WARNER.

BRONNER'S PATENT GAS-BURNERS give 99 per cent. of light, as compared with 37 per cent. given by ordinary burners, with equal consumption of gas.—*Vide* "Gas Referees Report," published June, 1869.
HENRY GREENE AND SON, Sole Consignees of the Patent Improvements in Gas Lighting, 16 and 17, King William Street, LONDON, E.C.

RICHARD THOMAS & CO.,
40, GRACECHURCH STREET,
Manufacturers of
EWELL FIRE-BRICKS, CLAY, AND CEMENT.
Warranted the best quality.
WORKS AT EPSOM.

TO GAS COMPANIES, ENGINEERS, MANAGERS, &c.

DESIGNS & PLANS of GAS-WORKS,
EXTENSIONS AND ALTERATIONS,
DRAWINGS AND TRACINGS OF GASHOLDERS,
TANKS, RETORTS, RETORT-HOUSE FITTINGS,
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SCRUBBERS, ENGINES, BOILERS, EXHAUSTERS,
PURIFIERS, GOVERNORS, VALVES, &c.,
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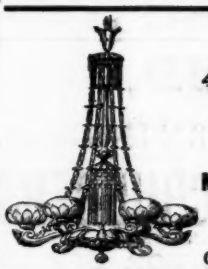

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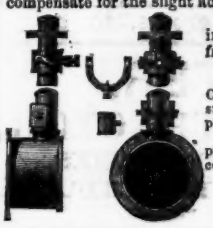

In support of his own experience as to the advantages to be derived from the invention, the patentee has the pleasure to submit the following testimonial from the Engineer of the Phœnix Gas Company:—
Phœnix Gaslight Company, Bankside, S.E., Engineer's Office, Dec. 19, 1873.
DEAR SIR,—I have fitted about 20 ascension-pipes at the Vauxhall Station of this Company with your patent joints, I am thereby enabled to remove the pipe when it is stopped and substitute a clean one in about ten minutes, cleaning out the obstructed pipe at leisure.
Until the happy time arrives when we can remove the necessity for "jumping" pipes at all, your joints will afford considerable relief. I trust your neat and ingenious contrivance will meet with the success it deserves. Yours faithfully,
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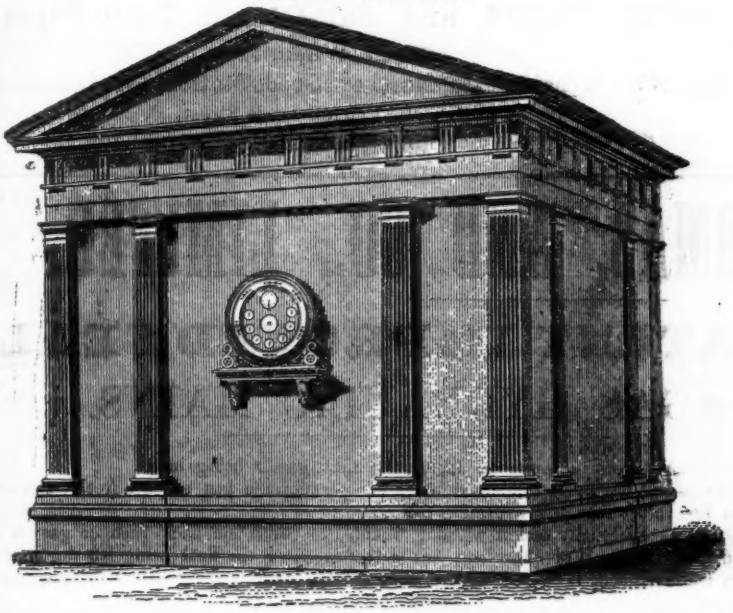

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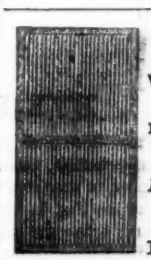

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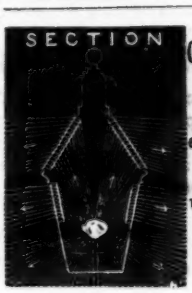

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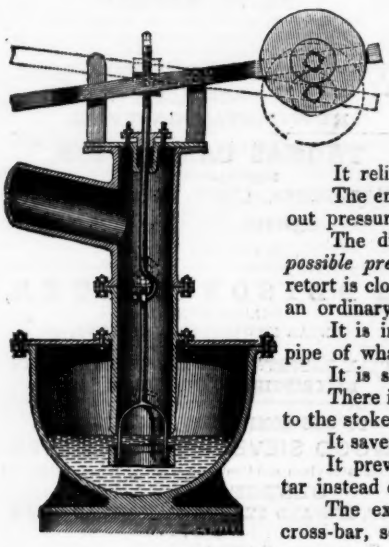

PATENT IMPROVED SEAL

FOR

GAS HYDRAULIC MAINS.

It relieves the retorts from all pressure during the time gas is being made.

The end of the dip-pipe not being immersed in the tar, permits the gas to pass freely, and without pressure, from the retort into the hydraulic main.

The dip-pipe can be effectually sealed without trouble, to resist the back rush of gas, *to any possible pressure*, during the time of charging; but in the event of the Seal being left on, after the retort is closed, no inconvenience is caused, as the piece of pipe used as the Seal only lengthens it to an ordinary dip-pipe.

It is inexpensive, and can be easily and readily applied to any existing hydraulic main and dip-pipe of whatever shape or size, at a trifling cost.

It is simple in its arrangement, and cannot get out of order.

There is no deposit of carbon on the top of the retort, thereby saving considerable time and trouble to the stokers when drawing and charging, also the injury caused by scurfing the retort is avoided.

It saves 10 per cent. of the coal carbonized; also the same proportion of fuel, retorts, labour, &c.

It prevents the thickening of the tar in the hydraulic main, as the heated gas passes *over* the tar instead of being forced *through* it.

The extension piece of pipe is moved by a lever, from which hangs a ⅜-inch rod, hooked on the cross-bar, so that the lid of the retort cannot be struck without first sealing the pipe.

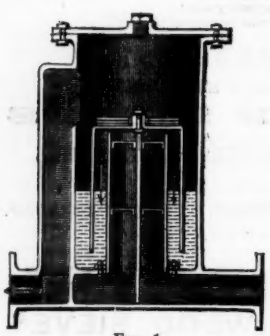

FIG. 1.

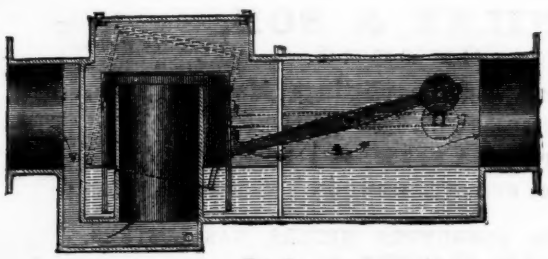

FIG 3.

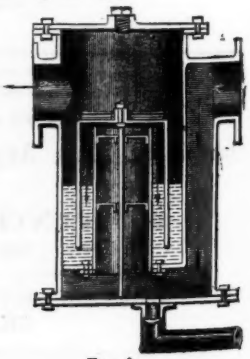

FIG. 2.

BYE-PASS FOR EXHAUSTER (Fig. 1).

This Hydraulic Bye-Pass has been invented for the purpose of supplying to gas companies a cheap, effective, and self-acting valve. It is simple in its construction, cannot get out of order, perfect in its action, can be made to stand any pressure, occupies very little space, and can be adapted to any existing pipes.

Fig. 2 is a Valve similar to Fig. 1, but made to act as a self-acting hydraulic bye-pass for washers, condensers, scrubbers, and meters; the Valve part being *below* the inlet and outlet, so that it may be applied to underground mains. Both Valves can be fitted to existing mains without disturbing them, more than the cutting out of a sufficient length to permit the fitting in of the Valve; after being properly fitted, they will require no further attention.

SELF-ACTING HYDRAULIC SAFETY-VALVE (Fig. 3),

For preventing the back flow of gas from the gasholder, and thereby preventing the possibility of accidents (the great damage and danger to life and property resulting therefrom) through the breaking of pipes, unsealing of purifiers, or any other cause. It is easy and prompt in its action, for upon the forward pressure of the gas ceasing, the bonnet *instantly* closes over the stand-pipe, thereby effectually preventing any return of the gas; no extra pressure is put upon any part of the works by its use, and it can be made to stand any required pressure.

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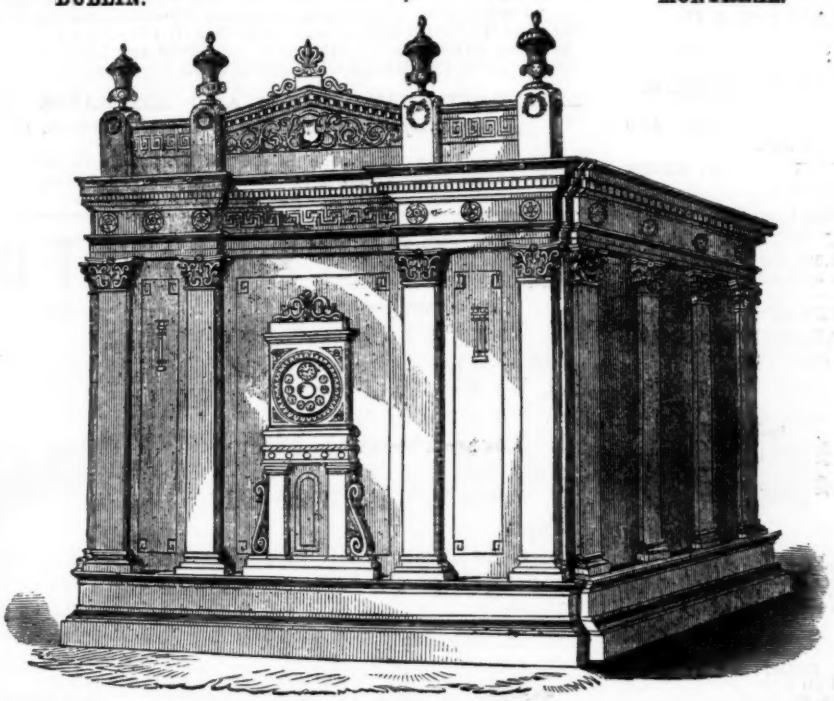

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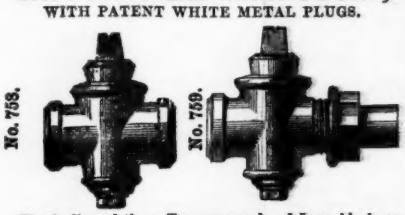

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Samples of Specialties may be inspected at Stand No. 542, Group XIII., in the English Machinery Annexe of the Vienna Exhibition, 1873. For List of same see German Official and "British Section" Catalogues.

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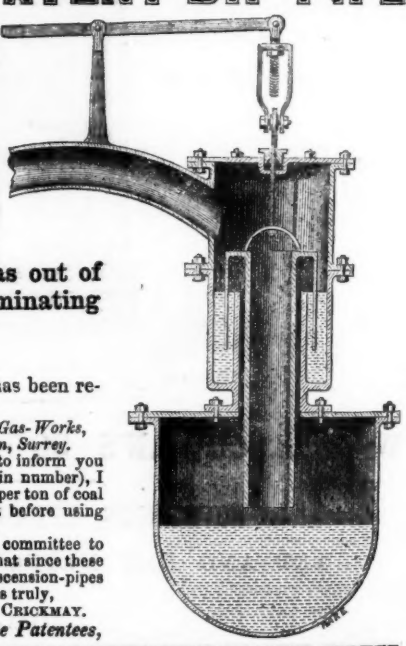
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